This is a digital copy of a book that was preserved for generations on library shelves before it was carefully scanned by Google as part of a project to make the world's books discoverable online.

It has survived long enough for the copyright to expire and the book to enter the public domain. A public domain book is one that was never subject to copyright or whose legal copyright term has expired. Whether a book is in the public domain may vary country to country. Public domain books are our gateways to the past, representing a wealth of history, culture and knowledge that's often difficult to discover.

Marks, notations and other marginalia present in the original volume will appear in this file - a reminder of this book's long journey from the publisher to a library and finally to you.

Usage guidelines

Google is proud to partner with libraries to digitize public domain materials and make them widely accessible. Public domain books belong to the public and we are merely their custodians. Nevertheless, this work is expensive, so in order to keep providing this resource, we have taken steps to prevent abuse by commercial parties, including placing technical restrictions on automated querying.

We also ask that you:

+ *Make non-commercial use of the files* We designed Google Book Search for use by individuals, and we request that you use these files for personal, non-commercial purposes.

+ *Refrain from automated querying* Do not send automated queries of any sort to Google's system: If you are conducting research on machine translation, optical character recognition or other areas where access to a large amount of text is helpful, please contact us. We encourage the use of public domain materials for these purposes and may be able to help.

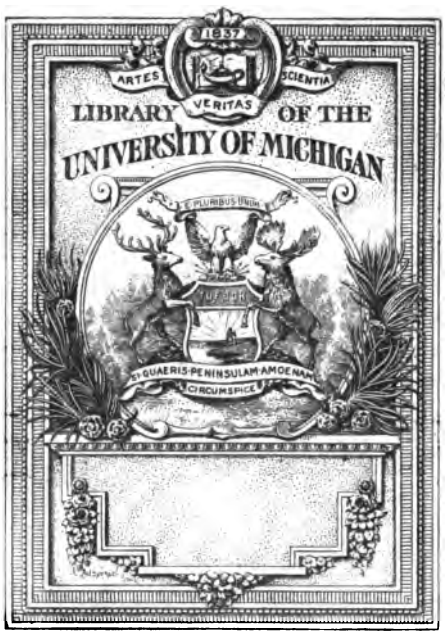
+ *Maintain attribution* The Google "watermark" you see on each file is essential for informing people about this project and helping them find additional materials through Google Book Search. Please do not remove it.

+ *Keep it legal* Whatever your use, remember that you are responsible for ensuring that what you are doing is legal. Do not assume that just because we believe a book is in the public domain for users in the United States, that the work is also in the public domain for users in other countries. Whether a book is still in copyright varies from country to country, and we can't offer guidance on whether any specific use of any specific book is allowed. Please do not assume that a book's appearance in Google Book Search means it can be used in any manner anywhere in the world. Copyright infringement liability can be quite severe.

About Google Book Search

Google's mission is to organize the world's information and to make it universally accessible and useful. Google Book Search helps readers discover the world's books while helping authors and publishers reach new audiences. You can search through the full text of this book on the web at `http://books.google.com/`

B 431658



THE GIFT OF
Mo. bd. of agriculture

S81
A3

TWENTY-SIXTH ANNUAL REPORT

OF THE

MISSOURI

STATE BOARD OF AGRICULTURE

FOR THE YEAR 1892.

TWENTY-SIXTH ANNUAL RE

OF THE

MISSOURI

STATE BOARD OF AGRI

FOR THE YEAR 1893.

630.679
M18a

TWENTY-SIXTH ANNUAL REPORT

OF THE

MISSOURI

STATE BOARD OF AGRICULTURE

FOR THE YEAR 1893.

JEFFERSON CITY, MO.:
TRIBUNE PRINTING COMPANY, STATE PRINTERS AND BINDERS.
1894.

LETTER OF TRANSMITTAL.

COLUMBIA, MO., March 20, 1894.

Hon. WM. J. STONE, Governor of Missouri:

DEAR SIR—We have the honor to transmit herewith the Twenty-sixth Annual Report of the State Board of Agriculture, accounting to you for the work of this Department for the year 1893.

While we believe the condition of the agriculturist in this State is as good, perhaps better than elsewhere, we cannot say that it is satisfactory.

Live-stock and grain are produced in many instances at an actual loss, and under the most favorable circumstance pay niggardly wages for the labor of production.

With the markets of the world practically closed against him, forced to meet his maturing obligations and contribute largely to the support of the national and state governments, with an appreciated currency, and a combination of capital that fixes the price of his productions without regard to supply or demand, are evils that threaten the agriculturist even in the face of blessings and advantages bestowed, with a lavish hand, by nature.

Trusting that we are in the dawn of a brighter day, when with more intense and progressive modes of farming, with an open field and equal opportunities, agricultural investments may prove profitable and labor remunerative, I have the honor to be,

Very respectfully,

J. R. RIPPEY, Sec'y.

271549

STATE BOARD OF AGRICULTURE.

EX OFFICIO MEMBERS.

Wm. J. Stone, Governor.
L. E. Wolfe, Superintendent Public Schools.
E. D. Porter, Dean Agricultural College.

DISTRICT MEMBERS APPOINTED BY THE GOVERNOR.

District.	Name.	Postoffice.	Term exp.
First	D. A. Ely	Sublett	July, 1894
Second	H. C. Ireland	Chillicothe	" 1896
Third	Alex. Maitland	Richmond	" 1896
Fourth	Eugene Rhoades	Fairfax	" 1894
Fifth	J. F. Groves	Corder	" 1896
Sixth	F. E. Bybee	Harrisonville	" 1895
Seventh	Wallace Estill	Estill	" 1894
Eighth	F. M. Russell	Conway	" 1894
Ninth	J. A. Potts	Mexico	" 1895
Tenth	A. W. Meyer	Labadie	" 1895
Eleventh	Norman J. Colman	St. Louis	" 1895
Twelfth	Joseph Donovan	St. Louis	" 1895
Thirteenth	W. R. Wilkinson	Altenburg	" 1896
Fourteenth	P. N. Gully	Hutton Valley	" 1896
Fifteenth	C. P. Cook	Round Grove	" 1894

OFFICERS.

Wallace Estill	President	Estill
Alex. Maitland	Vice-President	Richmond
J. R. Rippey	Secretary	Columbia
Ida L. Crune	Assistant Secretary	Columbia
John L. Ballinger	Treasurer	Columbia
T. J. Turner	Veterinarian	Columbia
E. Herbert Nimmo	Meteorologist	Columbia

EXCEUTIVE COMMITTEE.

Wallace Estill	Estill
J. A. Potts	Mexico
Alex. Maitland	Richmond
D. A. Ely	Sublett
E. D. Porter	Columbia

REPORT OF THE SECRETARY.

To the State Board of Agriculture:

The 37th General Assembly passed a bill reorganizing the State Board of Agriculture, and provided for the appointment of a new Board by the Governor within thirty days after the passage of the act, consisting of one member from each congressional district and the Governor, Dean of the Agricultural College and Superintendent of Public Schools, *ex officio* members. When this law went into effect the Governor promptly named a new Board of Agriculture, and convened the new members on the 20th day of July for organization.

Since that date the present Board and its officers are responsible for the work done in this department.

Much work was to be done, the time limited, and the clerical force inadequate. The office quarters were limited to one room about fifteen feet square, into which were crowded Secretary, Assistant Secretary, stenographer and janitor, and the furniture consisted of one desk, type-writer, table for folding, and job press.

The Board of Curators of State University had at the annual meeting prior to this filed a written communication kindly proffering to us, after the first of September, large and commodious rooms in Agricultural College building, furnished with elecrtric lights, water and other modern improvements.

Your Secretary called upon the Board of Curators at their first meeting in September for the purpose of accepting their very liberal proposition, only to find that H. A. McNally, of the Weather Service connected with this Department, had reported through Dr. E. D Porter that we had decided to remain in present quarters, and the rooms intended for our Board had been used for other purposes. The report from Mr. McNally was unauthorized and unwarranted.

However, the Board of Curators gave the matter careful consideration, gave us two additional rooms, furnished us with stoves, fuel and lights, and have done what was possible under the circumstances to give us sufficient and comfortable rooms. We are further assured that

upon the completion of the Academic building, now in construction, we will again be tendered such quarters as will comport with the magnitude and dignity of the work.

The annual report for 1891 was just being distributed and the people were clamoring for later reports. Monthly crop bulletins, as required by law, were to be issued.

An Institute force was to be organized and a series of Farmers' Institutes to be located and advertised and held.

Since that time the 25th Annual Report for the year 1892 has been compiled, edited, and is now ready for distribution.

Monthly crop bulletins for August, September, October and November were issued, showing the condition and yield of staple crops for 1893, and relative number and condition of live-stock, and containing in addition thereto such matters pertaining to the agricultural, horticultural and live-stock interests of our State as would answer queries constantly received at this office. Some of these bulletins were freely advertised by the press, and have been called for from most every State in the Union.

It would seem that an important work for the State Board would be the gathering and dissemination of such information relative to the wonderful resources of our State as would impress at least our own citizens with the possibilities of Missouri, the proud position she occupies today, and the grand future that awaits her as an agricultural, horticultural and stock-breeding State, that they might properly appreciate what certainly is a favored garden of creation.

Our exhibit of products at the "World's Fair," at Chicago, during the last season, as shown by November Bulletin, was not what it should have been, not, by far, what we might have made it; yet we are proud of having the distinction of having won more prizes than any state in the Union.

Data and cuts of winning stock have been collected with a view of issuing a bulletin entitled "Missouri at the World's Fair," which will include a complete list of awards, reports of superintendents of departments and cuts of improved stock.

Much data for the report of 1893 is now in the office. In addition to the information usually collected by this Department, we have undertaken, at the suggestion of Governor Stone, to collect a statement of the surplus agricultural products shipped from the State. Some of the steamboat companies that have ceased to operate for the season, have already furnished the required information, and others have promised to do so. The management of the different railroad lines in the State have promised, either through their auditors' office

or station agents, to comply with requests for information, and circulars for about 2500 stations have been supplied. The express companies have also promised compliance and have been furnished with blanks. We expect some difficulty in procuring information not acquired in this way, as no appropriation has been asked or made for this purpose and the fund for office expense and clerical labor is limited to the bare necessities of office work. But by strict economy and judicious expenditure we trust it will be possible to collect and compile the information.

Your Executive Committee have, in their judgment, seen proper to send Dr. Turner as a representative of this State to the International Veterinary Convention held in Chicago, October 16, 17, 18, 19 and 20, 1893, also a delegate to the annual meeting of the United States Veterinary Medical Association, held at the same time and place, of which Dr. Turner was made Secretary. He was also delegate to represent your Board and this State at the meeting of the Live Stock Sanitary Convention held at Dallas, Texas, under the auspices of the Texas Live Stock Sanitary Commission, which was expected to consider and discuss quarantine lines and the transportation of Southern cattle.

For want of general attendance, and upon the suggestion of your representative, the Convention adjourned to meet in Kansas City on the 15th day of November. Hon. J. A. Potts was delegated to attend this meeting and presided over its deliberations.

Your Secretary was appointed to represent this State at the International Good Roads Congress convened in Chicago, October 16, and attended two sessions, when by reason of important matters he was recalled to the office. Reports of the delegates to these meetings are on file in this office.

FARMERS' INSTITUTES.

Calls for Institutes, to be held under the auspices of the State Board of Agriculture, were received from 76 counties. The present Board not being organized till July 20, 1893, and the time to make all needed arrangements for Institute work being short, it was thought best to hold only about 25 Institutes, so the places selected for holding the same were such as gave promise of greatest success and at the same time would distribute the meetings well over the State.

In the selection of speakers and institute workers, care was taken to secure practical and successful men in their several lines.

Hon. N. F. Murray, of Oregon, Vice-President of the State Horticultural Society, presented at the several meetings the subjects of "Horticulture" and the "Possibilities of Missouri as a Fruit State," and the Organization and Work of the State Board of Agriculture.

Mr. J. W. Rouse, a practical bee-keeper and poultry raiser of Mexico, Mo., gave talks on bees and poultry.

Dr. R. A. Ramsey, of Mexico, spoke on Veterinary Science, Stock Breeding and Animal Feeding with a view of health.

Col. G. W. Waters, of Canton, Mo., a life-long farmer and stock-raiser, presented such subjects as "Soil Improvement," "Rotation of Crops," "Stock-feeding and Tillage." These subjects were illustrated by charts.

These four speakers attended the entire series of meetings.

Hon. T. B. Terry, of Hudson, Ohio, attended the meetings the first two weeks and spoke on "Renovation of Land," "Care of Clover" and "The Wife's Share."

J. H. Patterson, of Kirksville, a successful dairyman and farmer, attended for three weeks and spoke on "Dairying," "Care of Feed," "Saving the Waste on the Farm," etc.

Dr. T. E. White, Deputy State Veterinarian, Sedalia, Mo. attended the meetings when not professionally engaged, speaking on "Digestion," "State Veterinary Service" and "Animal Diseases."

Dr. H. B. Adair, Deputy State Veterinarian, attended three meetings, presenting subjects appertaining to his profession.

Dr. J. S. Meyer, Deputy State Veterinarian, of St. Joseph, attended three meetings, presenting papers on Veterinary Science.

Rev. T. E. Abbott, of St. Joseph, President of the North American Bee-keepers' Association, attended the meetings at three places and spoke on the Apiary.

Mr. L. A. Goodman, Secretary of the State Horticultural Society, attended the meetings at Weston and Independence and spoke on Horticulture.

Mr. J. B. Durand, of Prairie City, joined us at Rockville, continuing six days, speaking on fruits.

Mr. Z. T. Russell, of Carthage, on behalf of the State Horticultural Society, met us at Walker, attending three meetings, and spoke on Berry Culture, mainly.

Mr. A. Nelson, Treasurer of the State Horticultural Society, joined us at Jackson, attending four meetings, speaking on "Salt as a Fertilizer" and "Fruit-growing in the Ozarks."

Dr. E. D. Porter, Dean of the Agricultural College, and Director of the Experiment Station, attended meetings at Fredericktown, Farmington and Fayette, speaking on the work of the College and Station.

Prof. Chas. Keffer, of the Horticultural department, Columbia, attended seven meetings, speaking on the work of the Agricultural College and horticultural experiments being conducted.

In addition to the above named speakers, Mr. W. H. Hammon, weather observer, St. Louis, attended the meeting at Farmington and spoke on Missouri Weather Service and its work.

Mr. Hiram Phillips, civil engineer, St. Louis, presented methods of road construction at Farmington.

H. Rowher, assistant chief engineer of the Missouri Pacific R. R., Sedalia, Mo., attended the road meeting at Chillicothe and gave a lecture on road construction, illustrated by drawings.

Hon. Levi Chubbuck, ex-Secretary of this Board, at the same place read an able paper on "Good Roads," also on "Agricultural Education."

Prof. Allen Moore talked upon the value of education in all vocations of life. His address was interesting and entertaining.

Rev. John Brewerton, of Willow Springs, entertained the Institute at that place with a well-prepared address upon God's command to "Subdue, multiply and replenish the earth."

Prof. Geo. W. Smith, principal of the high school at Washington, gave a talk at that place on Education, that was appreciated, and Mr. Chas. Busch, an able paper on horse-breeding.

T. B. Chandler was at Perryville and Farmington, and added much interest to the meetings at these places.

Meetings were held at 28 places; the attendence at all except two points was fair—said to be better than in previous years.

The increase in the requests for Institute meetings, and the deep interest manifested, is evidence of increased appreciation of this work by Missouri agriculturists.

These meetings cost an average of about $75.00 each. There was a two days' session at each point, and an average attendence of eight to ten speakers, and the above estimate includes the per diem of the force—their hotel bills and transportation. This is certainly as economical as it is possible to hold these meetings, and in making future estimates your Secretary would advise a more liberal allowance.

If this work is of value and is appreciated and demanded by the farmers and breeders of Missouri, we would suggest that the appropriation should be such as would enable the Board to hold biennial meetings in every county in the State.

The deplorable condition of public roads in the State is such as to force the conclusion, that in the near future something must be done for their improvement.

Would it not be well to have a "Department of Good Roads," in connection with the Board of Agriculture, with a sufficient appropriation to hold an annual convention, where the best manner of improvement might be discussed, machinery and material tested and such

other work as would inform and educate the people in the judicious and economical use of appropriations that must ere long be made in the interest of "Good Roads."

VETERINARY SERVICE.

From a concise report laid before me by Dr. T. J. Turner, State Veterinarian, we find that the live-stock of the State is in a very satisfactory condition from a sanitary standpoint. These figures are compiled from the reports of the work of previous years, and show as follows:

	1892	1893
Diseases treated	29	24
Contagious diseases	4	3
Glanders and farcy	187	109
Tuberculosis	111	3
Actinomycosis	27	2
Texas fever	327	0

By examining these figures you will see that there has been a great diminution in the number of animals affected, and also in the number of diseases. Of the diseases of 1892, only four were of such nature as to cause serious alarm, and one of these, Texas fever, has not appeared in 1893. There has also been a decrease of ten or more in the number of affected counties.

This improved condition in the health of the live-stock of the State, and the decrease in number of contagious diseases and number of affected animals, is no doubt due to the value of our Veterinary Service and the watchfulness and efficiency of your State Veterinarian.

Experimental work has been totally neglected— First, for want of funds, and secondly, because the Veterinarian's time was demanded in field work.

The finances of this Service are in a very healthy condition, there having been expended for 1893, $6860.73, and leaving a balance for 1894 of $8139.27.

STATE WEATHER SERVICE.

The work carried on during the past year by this Department may be summed up as follows:

MONTHLY BULLETIN.

There has been published each month, a Bulletin made up from reports received from voluntary and United States Weather Bureau observers throughout the State, showing in a full and complete manner the meteorological features and conditions having prevailed in each

section. This report is mailed to an average of 225 addresses. Much credit is due the voluntary observers for the promptness and accuracy with which they have reported during the past year, and to their efficiency is largely due the excellent condition the Service has attained.

WEATHER CROP BULLETIN.

The work of publishing this Bulletin during the 26 weeks of the crop-growing season was carried on very successfully. This report is a weekly summary of the climatic and crop conditions in each section of the State, and is made up from reports received from a large corps of crop correspondents throughout the State. The value of this publication has been evinced by the increasing demand for copies of the same and the fact that 422 crop correspondents reported for the last issue of the season, October 3. The report during the past season had an average circulation of 1000 copies weekly, from this and the St. Louis office, and being duplicated in "patent sheet" newspapers to the extent of 90 papers, with an average circulation of 700 papers weekly.

VOLUNTARY AND REGULAR U. S. WEATHER OBSERVERS' STATIONS.

The year closes with 109 voluntary and five regular United States Weather Bureau stations in the State, and 14 reporting stations on the borders of adjacent states, making a total of 128 reports available for the monthly Bulletin of this service.

The instruments in the hands of voluntary observers and furnished by the State are as follows: Maximum thermometers, 26, minimum thermometers, 25, exposed thermometers, 2, and rain gauges 76. There are on hand the following serviceable instruments: Maximum thermometers, 2, minimum thermometers, 3, exposed thermometers, 2, and rain gauges 12.

Upon recommendation of the present Observer, under date of December 6, in order that the work of the service be further extended and observation points established in counties from which there are at present no reports available, an order has been given Messrs. Schneider Bros., New York, for 12 sets of maximum and minimum thermometers. These instruments were purchased at a cost of $5.80 per complete set.

More instruments may be necessary in the near future, but the condition of fund for this service is such as to cover only the necessities of office expenses, and precludes the idea of further purchases, for the present, at least.

With the assistance of Mr. E. H. Nimmo, Observer and assistant Director at this station, it is expected that the service will be efficiently

rendered and will prove of much value and interest to the people of the State.

The almost unbounded liberality of the General Government in the interest of agriculture in the United States, would encourage us to believe that some arrangements might be made whereby the Bulletins and other publications of this department might be distributed through the mails free of charge, and in this way the volume of information and its distribution materially increased.

Again, the Government collects, through its Statistician for this State, the same crop statistics that are collected by this office. In the interest of economy, some arrangement should be made whereby the same data could be used in both offices.

Financial statement showing the present condition of each fund is herewith transmitted.

FINANCIAL STATEMENT

SHOWING EXPENDITURES FOR AND CONDITION OF EACH FUND.

FARMERS' INSTITUTE FUND.

Date.	Name.	Dr.	Cr.
	Amount on hand	$2,348 96	
Jan. 10..	By O'Brien		$33 95
	Adair		37 45
	Express		47 45
	Journal		7 50
	Cook		20 00
	World		7 50
	Times		9 00
	Harness & K		5 75
	Null		14 50
	Journal		15 00
	Nelson		10 00
	Fulbright		28 10
	Lynch		12 00
	Kidder Optic		5 75
	Hammon		6 95
	Herald		5 00
	Times		10 25
	Fulbright		29 75
	Emerie		11 50
	Conway Chief		11 00
	Randolph		14 50
	Ramsey		14 75
	Leonard		6 20
	Porter		3 50
	Keffer		5 90
	Potts		6 70
	Express		29 84
	Chubbuck		107 29
	Maitland		10 50
	Dugan		88 00
	Ledger		83 00
	Ely		9 65
	Mail		16 70
Mch. 27..	Ammerman		9 45
	Sears		25 00
	Turner		4 95
	Patterson		10 85
	Ireland		50 00
	Chubbuck		16 80
	Ledger		75 00
	Lamkin		50 00
	Lyman		25 00
	Barrett		19 25
	Clarkson		40 41
	Barker		149 75
	Terry		291 71
	Chandler		10 05
	Milan Standard		6 50

FINANCIAL STATEMENT—Continued.

Date.	Name.	Dr.	Cr.
Mch. 27..	By Optic News		$7 50
	H. O. Mills		9 45
June 14..	Chubbuck, salary		129 07
12..	Elkins		16 05
	Elkins		11 00
	Ammerman		1 80
	Massey		5 50
	Garth, salary		13 70
	Barrett		400 00
Jan. 23..	To deposit by Chubbuck	$128 38	
June 12..	By Ammerman		51 42
	Elkins		21 00
Aug. 9..	Elkins		10 50
	Cadogan & Hatcher		8 00
Sept. 6..	Elkins		20 00
	Stephens		12 25
	Garth, salary		4 60
	Ammerman		17 82
Oct. 4..	Postage		11 00
	Cadogan & Hatcher		5 00
	Parker Bros		5 50
	Waters		60 78
	Stephens		6 00
	Burroughs & Vivion		2 70
	Keffer		9 60
	Postage		20 00
	Behring		87 00
	Fustin		10 35
	Grimshaw		91 95
Nov. 1..	Waters		100 00
	Cadogan & Hatcher		6 24
	Stephens		9 00
	Postage		20 00
Dec. 6..	Waters		100 00
	Postage		15 00
	Cadogan & Hatcher		4 00
	E. T. Abbott		46 54
	Ammerman		6 85
Oct. 26..	To deposit by Grimshaw	2 21	
	By R. A. Ramsey		313 31
	H. Rowher		7 15
	Waters		13 50
	Phillips		7 20
	Russell		26 17
	Patterson		115 00
	Waters		153 80
	Wilkinson		31 37
	Chubbuck		15 40
	Ireland		6 50
	Darr & Co		13 50
	Meyer, printing		5 00
	Murray		236 39
	Rippey		79 68
	Terry		149 60
	White		104 95
	Nelson,		37 60
	Durand		64 20
	Hammon		3 40
	Rouse		199 70
	Meyer		15 20
	Rippey		178 44
	To requisitions	3,014 98	
	By balance in our treasury		849 95
		5,494 53	5,494 53

FINANCIAL STATEMENT—Continued.

RECAPITULATION.

Date.	Name.	Dr.	Cr.
Jan. 7, '93	To balance	$2,348 96	
	deposits	130 59	
	appropriation 1893 and 1894	8,000 00	
Jan. 1, '94	By total expense		$4,644 58
	balance in our treasury		849 95
	balance in State treasury		4,985 02
		10,479 55	10,479 55

CROP REPORTS.

Jan. 7..	Balance on hand	$752 69	
	Total requisition	936 83	
12..	By Stephens		$360 00
Mch. 27..	Stephens		171 85
	Stephens, supplies		66 30
	Annual report		250 00
	Elkins		16 18
	Elkins		25 40
	Ammerman		5 13
	Stephens		25 00
	Stephens, supplies		1 60
	Barrett		2 50
	Barrett		45 00
June 14..	Elkins		47 35
	Stephens		100 00
	Stephens		50 00
	Office expenses		32 00
July.....	Elkins		30 90
	Stephens		23 65
	Stephens		25 00
	Stephens, supplies		3 25
	Stephens		35 00
Aug. 9..	Ammerman		2 53
	Elkins		3 50
	Elkins		5 50
	Stephens		1 50
	Elkins		27 00
	Cadogan & Co		6 24
Sept. 6..	Stephens		37 60
	Garth		1 10
	Elkins		30 00
Oct. 4..	Stephens		50 00
	Rippey, postage		30 00
Nov. 1..	Stephens		50 00
	Rippey, postage		20 00
Dec. 6..	Rippey, postage		15 00
	Stephens		49 35
July 20..	Garth		3 44
		1,689 52	1,588 87

FINANCIAL STATEMENT—Continued.

RECAPITULATION.

Date.	Name.	Dr.	Cr.
1893.			
Jan. 7....	To balance on hand	$752 69	
	To appropriation 1893 and 1894	2,000 00	
1894.			
Jan. 1....	By total expenditures	.....	$1,588 87
	By balance in Treasurer's hands	.....	100 65
	By balance in State treasury	.....	1,063 17
		2,752 69	2,752 69

OFFICE EXPENSE FUND.

	To total requisition	$535 95	
Mch. 27..	By Guitar	.....	$2 50
	Hobbs	.....	44 05
	Typewriter	.....	2 00
	Office supplies	.....	6 36
	Wyckoff, Seaman & Benedict	.....	3 35
	Ammerman	.....	8 84
	Elkins	.....	66 48
May 10..	Hobbs, salary	.....	13 00
	Crume	.....	10 40
June.....	Hobbs, salary	.....	30 00
	To Veterinary Service	3 25	
	Crop reports	32 00	
	By Dickinson	.....	5 60
	Hatton	.....	15 45
	Burroughs & Vivion	.....	8 55
	Hubbell	.....	12 60
	Hobbs, salary	.....	12 00
	Crume	.....	6 00
	Hobbs, salary	.....	12 00
	Matthews	.....	2 25
	Burroughs & Vivion	.....	1 90
	Crume	.....	3 30
	Garth, salary	.....	1 72
July 20..	Hobbs, salary	.....	18 80
Aug. 9..	Elkins	.....	11 50
	Rippey	.....	2 65
	Elkins	.....	24 35
	Burroughs & Vivion, dictionary	.....	13 65
	Orange Judd Co	.....	13 50
	Cadogan & Co	.....	8 45
	Hobbs, salary	.....	7 20
Sept. 6..	Parker	.....	38 00
	Burroughs & Vivion	.....	8 15
	Hobbs, salary	.....	26 00
	Garth	.....	60
Oct. 4..	Hobbs, salary	.....	27 00
	Hobbs	.....	1 00
Nov. 1..	Hobbs	.....	26 00
Dec. 6..	Hobbs, salary	.....	26 00
		571 20	521 20
	By balance in Treasurer's hands	.....	50 00

FINANCIAL STATEMENT—Continued.

RECAPITULATION.

Total appropriation	$1,000 00
Total requisition	535 95
Balance in State treasury	464 05
Balance in Treasurer's hands	50 00
Total balance to credit office expense	514 05

EXPENSES OF MEMBERS.

Date.	Name.	Dr.	Cr.
Jan. 7...	To balance on hand	$276 23	
	Total requisitions	865 00	
Jan. 10..	By Burroughs & Vivion Bros		$5 85
	Statesman		7 50
	Elkins		29 40
	Bybee		20 50
	Colman		18 00
	Maitland		11 00
	Fulbright		46 20
	Emerson		25 00
	Hearne		15 00
	Cook		28 00
	Ireland		11 15
	Ireland, committee		11 15
	Potts		15 00
	Hearne		4 80
	Cowan		25 05
	Emerson		8 75
	Fulbright		28 50
	Maitland		18 90
	Truitt		2 50
	Ely		14 00
	Crume		104 15
	Emerson, protest		2 25
	Hearne, protest		2 70
	Ireland, protest		5 00
	Maitland		12 50
	Ely		11 10
	Ely		43 65
June 14..	Potts		4 20
	Ely		6 30
	Maitland		11 50
	Porter		2 80
	Ireland		9 00
	Crume		2 80
July 20..	Garth		2 05
Aug. 9..	Gentry		2 50
	Stone		7 20
	Meyer		18 85
	Ely		10 20
	Bybee		17 25
	Gully		34 30
	Russell		25 50
	Maitland		12 00
	Rhoads		20 60
	Ely		7 00
	Maitland		9 50

FINANCIAL STATEMENT—Continued.

Date.	Name.	Dr.	Cr.
Aug. 9..	By Potts		$7 15
	Rippey		3 30
	Crume		3 30
Sept. 6..	Garth		60
	Ely		9 20
	Maitland		12 00
Oct. 4...	Ely		9 25
	Maitland		11 25
Nov. 1...	Estill		12 00
	Maitland		12 00
	Ely		10 00
	Potts		18 30
Dec. 6...	Total expenditures		844 40
	Total receipts		1,176 23
	Balance in Treasurer's hands		331 83
	Total appropriation	$1,200 00	
	" requisitions	865 00	
	Balance in State treasury	335 00	
	Balance in Treasurer's hands	331 83	
	Total to credit of expenses of members	666 83	

DISTRIBUTION OF ANNUAL REPORT.

Jan. 7...	To balance on hand	$265 36	
	Total requisitions	656 31	
	To monthly crop reports	250 00	
Jan. 10..	By Tribune		$22 60
	Tribune		14 80
	Wallau		180 00
Mch. 27..	Ammerman		16 65
	Behring		38 72
	Ammerman		18 52
	Grimshaw		240 90
	Ammerman		28 47
	Behring		13 42
	Crume		15 25
	Grimshaw		337 56
	Elkins		23 00
	Garth		1 72
	Ammerman		52 58
	Crume		11 70
	Elkins		10 00
July 20..	Ammerman		17 76
	Elkins		15 00
	Grimshaw		113 02
Sept. 6..	Garth		60
	Total expenditures		1,162 97
	Total receipts	1,162 37	
	To overdraft	60	
	Total appropriation		$1,000 00
	Total requisitions		656 31
	Balance in State treasury		343 69
	Balance in Treasurer's hands, overdraft		60
	Total balance to credit of Annual Report		343 09

FINANCIAL STATEMENT—Continued.

WEATHER SERVICE.

Date.	Name.	Dr.	Cr.
Jan. 7..	To balance on hand	$288 47	
	To requisition	515 17	
10..	By Stephens		$40 00
	Hobbs		30 00
Mch. 3..	Hobbs		30 00
27..	Queen & Co		35 00
	Stephens		55 00
	Stephens		3 00
	Stephens		55 00
	Richards		2 50
	Message delivery		5 40
May 1..	Message delivery		5 00
	Type		12 62
June 14..	Richards		1 50
	Newman		2 35
	Stephens		104 50
	Ammerman		1 35
July 20..	Stephens		30 00
	Message delivery		5 10
	Garth		1 72
	Crist & Son		12 00
Aug. 9..	Stephens		25 00
	Queen & Co		49 10
	H. A. McNally		50 00
	Message delivery		2 70
Sept. 6..	Stephens		28 00
	Garth		60
	Ammerman		1 70
Oct. 4..	Stephens		25 00
	Message delivery		2 60
	Message delivery		1 90
Nov. 1..	Ammerman		2 05
	Statesman		25 00
Dec. 6..	Stephens		25 00
	Hatton		28 00
	Total expenditures		698 69
	By total receipts		803 64
	Balance in Treasurer's hands		104 95

Total appropriation	$1,000 00
Total requisitions	515 17
Balance in State treasury	484 83
Balance in Treasurer's hands	104 95
Total balance to credit of Weather Service fund	589 78

RECEIPTS AND EXPENDITURES IN 1893.

State Board of Agriculture in account with Veterinary Fund.

Date.	Name.	Dr.	Cr.
1893.			
Jan. 7..	To balance on hand	$226 45	
11..	By Myer's account		$75 75
	Adair		8 75
	Turner		2 50
	White		95 00
Mch. 27..	Turner		713 55
	White		117 15
	Anderson		2 50
	Meyer		27 75
	Rouif		30 75
	O'Brien		14 40
	Adair		28 49
	Adair		26 66
	T. H. Printing Co		3 25
	Blalock, stenographer		150 00
	Ammerman		2 44
	Ireland		21 10
	Emerson		20 25
	Cook		25 00
	Hearne		12 75
	Cowan		21 00
	J. Y. Fulbright		23 75
April 10..	To appropriation—		
May 10..	By Bruser		50 00
	Rouif		111 01
	Booth		33 16
	Jackson		10 00
	O'Brien		23 70
	Meyers		51 25
	Adair		23 63
	Office expenses		3 25
	Expenses, members		35 00
	Turner		328 71
	Burkhardt, stenographer		64 00
	Emerson, protest fees		3 50
	Hearne, protest fees		2 50
	Ireland, protest fees		2 75
	Boughner		20 00
	Tillery & Prather		3 20
	Clarkson, Treasurer		9 59
	O'Brien		27 00
June 14..	White		101 20
	Boughner		101 25
	Rouif		107 84
	Bruser		50 00
	Adair		33 72
	Ammerman, express		3 60
	O'Brien		39 15
	Turner		324 02
	B. & Vivion		3 50
	Elkins		5 75
July 12-20	Ammerman		2 44
	Boughner		100 00
	Rouif		133 38
	Adair		14 50
	Bruser		50 00
	Barrett, printing		16 00

RECEIPTS AND EXPENDITURES—Continued.

Date.	Name.	Dr.	Cr.
July 12-20	By Turner		$333 83
	Garth, Treasurer		25 65
	Massey		7 50
	Burkhardt, stenographer		40 00
	White, for May		94 55
	White		131 25
	Brus.er, ½ month		25 00
	T. & H., protest		3 00
Aug. 9..	Rouif		100 50
	White		30 30
	Burkhardt, stenographer		40 00
	O'Brien		7 50
	Boughner		100 00
	Turner		241 28
Sept. 6..	Turner		307 30
	Meyer		15 00
	Statesman		3 00
	Boughner		104 35
	O'Brien		11 00
	White		20 75
	Garth, Treasurer		8 56
	Ammerman		1 55
Oct. 4..	Ammerman		80
	Maud Rippey		40 00
	Adair		27 40
	Saunders & Park		3 00
	White		86 75
	Boughner		103 75
	Meyer		16 25
	Rouif		7 50
	Turner		270 53
	Burkhardt, salary for September		40 00
Nov. 1..	Turner		277 38
	White		142 15
	Meyer		47 10
	Adair		28 65
	Boughner		103 20
	Maud Rippey		40 00
	J. R. Rippey		11 40
	Ammerman		5 23
	O'Brien		24 35
	Rouif		46 30
Dec. 6..	Boughner		105 05
	Maud Rippey		40 00
	Carter & Co		3 00
	Stephens		7 50
	Anderson		5 00
	Meyer		10 90
	Rouif		13 50
	Turner		20 50
	Total expenditure		6,680 20
	To Board of Curators	$95 00	
	Levi Chubbuck	130 00	
	Total requisitions	6,929 30	
	Total receipts	7,380 75	
	Balance in hands of Treasurer		700 55

RECEIPTS AND EXPENDITURES—Continued.

RECAPITULATION.

Total appropriation	$15,000 00
Total requisitions	6,929 30
Balance in State treasury	8,070 70
Balance in Treasurer's hands	700 55
Total balance to credit of Veterinary fund	8,771 25

SECRETARY'S SALARY.

Date.	Name.	Dr.	Cr.
	To total appropriation	$2,400 00	
	By Levi Chubbuck		$41 86
Mch. 27..	Crume		258 14
May 10..	Crume		100 00
June 1..	Crume		100 00
July 1..	Crume		100 00
Aug. 1..	Crume		66 67
1..	Rippey		33 33
Sept. 1..	Rippey		100 00
Oct..	Rippey		100 00
Nov.....	Rippey		100 00
Dec. 1..	Rippey		100 00
Jan. 1, '94	Rippey		100 00
	Total		1,200 00

ASSISTANT SECRETARY'S SALARY.

Date.	Name.	Dr.	Cr.
	To total appropriation	$1,200 00	
	By Crume		$20 97
June.....	Condict		40 00
14..	Chubbuck		129 03
July.....	Condict		50 00
Aug. 1..	Crume		22 50
Sept.	Crume		50 00
Oct.	Crume		50 00
Nov.	Crume		50 00
Dec.....	Crume		50 00
Jan. 1, '94	Crume		50 00
	Total		512 50
	Total balance in State treasury	$687 50	

OLD FUND.

To balance	61 39

MEETING OF THE STATE BOARD FOR ORGANIZATION.

SECRETARY'S OFFICE, COLUMBIA, MO., July 20, 1893.

The members elect of the Missouri State Board of Agriculture, appointed by His Excellency, Governor Wm. J. Stone, under the act passed by the Thirty-seventh General Assembly, met for organization at 2:30 o'clock p. m., Thursday, July 20, 1893, in the office of the Secretary, in the Experiment Station building, Columbia, Mo.

The meeting was called to order by the Governor, and the Hon. Norman J. Colman made temporary chairman.

The following members responded to roll-call:

EX OFFICIO MEMBERS.

His Excellency, Wm. J. Stone, Governor.
Dr. E. D. Porter, Dean of the College of Agriculture.

APPOINTIVE MEMBERS BY CONGRESSIONAL DISTRICTS.

D. A. Ely, First district..... Sublette, Adair county
Alex. Maitland, Third district..... Richmond, Ray county
Eugene Rhoads, Fourth district..... Fairfax, Atchison county
J. F. Groves, Fifth district ..... Corder, Lafayette county
Wallace Estill, Seventh district ..... Estill, Howard county
F. M. Russell, Eighth district..... Conway, Laclede county
J. A. Potts, Ninth district..... Mexico, Audrain county
A. W. Meyer, Tenth district..... Labadie, Franklin county
Norman J. Colman, Eleventh district..... 5471 Delmar Ave., St. Louis City
W. R. Wilkinson, Thirteenth district..... Altenburgh, Perry county
P. N. Gully, Fourteenth district..... Hutton Valley, Howell county

A Committee on Credentials and formal order of business was dispensed with and the election of permanent officers immediately entered upon.

Honorable J. A. Potts of the Ninth congressional district was nominated by Governor Stone, for President of the Board. The nomination was seconded by F. M. Russell. There being no further nominations, a ballot was dispensed with and the Secretary directed to record the total vote for J. A. Potts for President.

In a brief, happily worded speech, Mr. Potts thanked the members for the honor conferred, and asked the further pleasure of the Board.

For Vice-President, Alex. Maitland of the Third congressional district, was nominated by N. J. Colman, seconded by W. R. Wilkinson. There being no further nominations, the Secretary was directed to record the full vote of the Board for Alex. Maitland for Vice-President

For Treasurer of the Board, W. W. Garth, John Ballenger and H. W. Banks were placed in nomination.

Governor Stone suggested that as he was in receipt of a telegram from Centralia, notifying him that at least one more member would be present after the arrival of the next train, it might be well to defer the election of Treasurer until that time.

Motion made and carried that the election be deferred until the arrival of the next train, not later than 4:30 o'clock p. m.

During the recess, the Executive Committee of the old Board audited the accounts for the preceding month, and made requisition on the State Auditor for the amount necessary to meet present and anticipated accounts against the several funds.

A notary was summoned and five members of the Board took the oath of office.

At 4:15 o'clock p. m., Senator F. E. Bybee, member of the Board from the Sixth congressional district, arrived, and the President called the meeting to order.

The name of H. W. Banks was withdrawn, and the ballot for Treasurer resulted in 12 votes for John Ballenger and one vote for W. W. Garth, the President not voting.

The election of Secretary was next in order, and Norman J. Colman placed John R. Rippey, of Schuyler county, in nomination. The nomination was seconded by Alex. Maitland and Governor Wm. J. Stone, who briefly reviewed the history of Mr. Rippey, so far as it would affect his fitness for the position for which he was a candidate.

There being no further nominations, the Secretary was directed to record the full vote of the Board, fourteen members being present, for J. R. Rippey for Secretary of the Board.

The position of assistant Secretary was made elective by the new law, and Ida L. Crume, for the past three years assistant in the office of the Secretary, and since January, 1893, in charge of the work as acting Secretary of the Board, was placed in nomination by D. A. Ely.

The nomination was seconded by Alex. Maitland and Governor Colman, who each commented most favorably on the conduct of the office during the past six months in Miss Crume's charge.

There being no further nominations, the full vote of the Board was cast for Miss Crume for Assistant Secretary.

The following gentlemen were elected an Executive Committee by acclamation:

J. A. Potts, Alex. Maitland, D. A. Ely, Wallace Estill and E. D. Porter.

The following resolution, offered by Governor Colman, was then adopted:

Resolved, That the State Board of Agriculture hereby expresses its high appreciation of the excellent work done by the late Secretary of the Board, Levi Chubbuck, who for several years has been its Secretary, and that he has the best wishes of the members of the Board in whatever pursuit he may hereafter follow.

The desirability of Missouri's being represented in the National Convention of American Association of State Weather Service Officials, to be held during the month of August in Madison, Wis., was brought to the attention of the Board by H. A. McNally, Observer U. S. Weather Bureau and Assistant Director Missouri State Weather Service.

The Board directed Mr. McNally to attend the convention as the representative of the Missouri State Weather Service, and voted $50, to be paid out of the State Weather Service fund, for his expenses.

On motion, the salary of the Secretary was fixed at $1200 and that of the Treasurer at $100 per annum.

The unexpended balance, $360, of the $600 appropriated, was allowed for salary of Assistant Secretary for the remainder of 1893.

Dr. T. J. Turner, the State Veterinarian, stated to the Board that there was in the hands of the Board of Curators of the State University $90, arising from the sale of some cattle and apparatus, which should be paid into the State Veterinary fund of the State Board of Agriculture, and $130 from the same source and belonging to the same fund in the hands of Mr. Levi Chubbuck, and requested some action on the part of the Board looking to the transfer of the funds.

On motion, the Secretary of the Board was instructed to collect of the Board of Curators and Mr. Chubbuck the funds due the Veterinary Service.

On motion, the State Veterinarian was empowered to dispense with the services of one inspector in the city of St. Louis.

Wallace Estill, member of the Board from the Seventh congressional district, made a statement of some recent unjust discrimination in the city of Chicago against Missouri cattle, and Governor Stone moved that the Secretary of the Board, together with President J. A. Potts and Mr. Estill, conduct a correspondence with the Secretary of Agriculture, Washington, D. C., Insurance Inspectors in Chicago, and such other parties as they may see proper, with a view of having restrictions against Missouri cattle removed. Carried.

The President appointed Wallace Estill, Chairman, David Ely and H. W. Wilkinson a committee to examine into the affairs of the Agricultural College and Experiment Station, as required by section 7, law of 1893, to make report at the annual meeting.

The term of service, determined by lot, resulted as follows:

For a term of one year from July 20, 1893.

D. A. Ely, Eugene Rhoads, Wallace Estill, F. M. Russell and C. P. Cook.

For a term of two years from July 20, 1893.

F. E. Bybee, J. A. Potts, N. J. Colman, A. W. Meyer and Jos. T. Donovan.

For a term of three years from July 20, 1893.

H. C. Ireland, Alex. Maitland, J. F. Groves, W. R. Wilkinson and P. N. Gully.

This completing the business before the Board, the meeting adjourned.

OFFICE STATE BOARD OF AGRICULTURE,
COLUMBIA, MO., Jan. 9, 1894.

The 26th annual meeting of State Board of Agriculture was called to order at 2:30 p. m. at Secretary's office by the President, J. A. Potts.

The following members were present and answered to roll-call: Gov. Wm. J. Stone, D. A. Ely, H. C. Ireland, Alex. Maitland, Eugene Rhoads, John F. Groves, J. A. Potts, A. W. Meyer, W. R. Wilkinson, C. P. Cook and E. D. Porter.

Minutes of meeting held for reorganization on 20th July last were read and approved.

Secretary submits a report of the work of the Board for 1893, together with a statement of condition of funds.

Ordered that report be received and placed on file.

Auditing Committee, consisting of H. C. Ireland, J. F. Groves and A. W. Meyer, submit following report:

COLUMBIA, MO., Jan. 9, 1894.

State Board of Agriculture:

We, your committee directed to audit the accounts of Treasurer of this Board, beg to report that we have examined the books and vouchers of Secretary Rippey, also the checks of Treasurer, Mr. Ballinger, and find them, so far as examination, to be entirely correct.

(Signed) H. C. IRELAND,
J. F. GROVES,
A. W. MEYER.

Ordered that report be received and committee discharged.

Judge W. R. Wilkinson, on part of the committee, consisting of Messrs. Estill, Ely and Wilkinson, appointed to examine the affairs of the Agricultural College and Experiment Station, reports that Mr. Estill, Chairman, is sick, that while they have made progress are unable at this time to submit a full report.

Ordered that committee be granted further time for investigation, and are instructed to report to Secretary.

Dr. E. D. Porter suggested that a standing committee of five be appointed, whose duty it should be to confer with the Dean of the Agricultural College in regard to experiments and work on the Agricultural farm.

Judge W. R. Wilkinson moved the appointment of such committee by the President, to consist of one member from each of the five agricultural districts of the State.

Gov. Stone suggested that it would be well to make member of Executive Committee, where one was residing in the district, a member of this committee, as the work might be done while attending executive meeting and without additional cost.

The motion was sustained, and President Potts instructed to report names of committee to Secretary.

Adjourned to meet at 8 o'clock a. m. on 10th.

COLUMBIA, MO., Jan. 10, 1894.

State Board of Agriculture met pursuant to adjournment.

The following resolution, introduced by Mr. Ireland, was adopted, and the Secretary instructed to furnish "Blind Boone" with a copy:

WHEREAS, the world-renowned musical prodigy, "Blind Boone," invited the Board to attend a musical concert at his home in this city, after attendance, be it

Resolved, that as a musical wonder, both as a vocalist and pianist, he is in our opinion unsurpassed, and the entertainment was a rare treat for which we extend our sincere thanks.

The following invitation was received from Board of Curators, was accepted, and the Curators notified that we would meet with them:

COLUMBIA, Jan. 9, 1894.

Hon. J. A. POTTS, *President State Board of Agriculture:*

DEAR SIR—I am directed by the Executive Board of the University to extend to the State Board of Agriculture, through you, an invitation to meet with said Executive Board at their office at 9 o'clock tomorrow morning. The Executive Board desire to furnish your Board every facility for examining into the affairs of the Agricultural College and Experiment Station, and that you may call for and receive any information concerning the same which it may be in their power to give. The Board of Agriculture are also invited to examine and inspect all of the University buildings, and particularly those specially devoted to the College of Agriculture and the Mechanic Arts. Very truly,

J. G. BABB, Secretary.

The following communication was received from President Jesse, and placed on file:

COLUMBIA, MO., Jan 9, 1894.

Hon. J. A. POTTS:

DEAR SIR—I beg leave officially to invite you, and through you all the members of the State Board of Agriculture, to visit, whenever it may prove convenient, the University and its buildings and grounds. Very truly yours,

R. H. JESSE.

Dr. Paul Paquin presents warrant issued to him in 1891, which has never been presented for payment. Said warrant was for $7.00, dated ——, 1891, numbered and signed by J. A. Potts, President, and Levi Chubbuck, Secretary.

Ordered that warrant in payment be drawn on fund of $225 collected by the Secretary from Levi Chubbuck and Board of Curators, and by him deposited with the veterinary fund.

Moved by Mr. Ely that balance of $61.39 in old fund be transferred to distribution fund of 1893 and 1894, and motion sustained.

C. P. Cook offered resolution thanking officers and employes of the Board for efficient work in 1893.

Mr. Cook also offered the following resolution, which was unanimously adopted:

Resolved, That we tender thanks to Dr. R. H. Jesse, President of the University, for uniform kindness and courtesy to this Board, and to him and Mrs. Jesse for hospitable entertainment at their residence.

ELECTION OF OFFICERS.

Hon. Wallace Estill was nominated for President, by Judge W. R. Wilkinson.

Hon. J. A. Potts was nominated by H. C. Ireland. Mr. Potts declined re-election, stating that he had enjoyed the honors for several years, and thought they ought to be distributed among other equally meritorious members of the Board.

Gov. Stone, upon the declination of Mr. Potts, seconded the nomination of Mr. Estill.

Upon motion of Dr. Porter, the Secretary recorded the vote of the Board for Mr. Estill.

Hon. Alex. Maitland was nominated for Vice-President and unanimous vote instructed to be so recorded.

Mr. Maitland nominated J. R. Rippey for Secretary. Nomination seconded by Judge Wilkinson, and H. C. Ireland moved that the President cast entire vote of Board for J. R. Rippey for Secretary.

The Board considered matter of election of Assistant Secretary, and on motion deferred the matter for further consideration.

John L. Ballinger was nominated for Treasurer, and on motion the Secretary was instructed to cast vote of the Board for him.

On motion, it was ordered that the present Executive committee, consisting of J. A. Potts, D. A. Ely, Alex. Maitland, Wallace Estill and E. D. Porter, continue to act for 1894.

Governor Wm. J. Stone offered the following resolution, which was unanimously adopted :

Resolved, That the Missouri State Board of Agriculture hereby expresses its high appreciation of the fidelity, ability and uniform courtesy with which Hon. J. A. Potts has served this Board during his presidency thereof, and that the Board wishes him every prosperity and happiness in life.

The Board then adjourned to meet with Board of Curators, where President Rothwell, in a very terse and able manner explained the organization and work in detail of the Agricultural College and Experiment Station.

Governor Wm. J. Stone replied in a brief talk, expressing his appreciation of every effort to build and strengthen the Agricultural College, trusting that it might occupy the same position as a department of the University as that of law or medicine.

Being no further business, the Board adjourned.

QUARANTINE MEETING.

EXECUTIVE CHAMBER, CITY OF JEFFERSON,
Tuesday, March 21, 1893.

On the call of His Excellency, the Governor, a meeting of the Missouri State Board of Agriculture was held at 2:30 o'clock p. m. Tuesday, March 21, 1893, in the executive office, Jefferson City, Mo., to formulate and adopt quarantine regulations relative to the shipment of Southern cattle into and through Missouri.

President J. A. Potts presided, and the following members responded to roll-call:

First district	D. A. Ely
Second district	H. C. Ireland
Third district	Alex. Maitland
Fourth district	B. O. Cowan
Fifth district	W. T. Hearne
Seventh district	J. Y. Fulbright
Ninth district	J. A. Potts
Tenth district	J. A. Massey
Eleventh district	N. J. Colman
Twelfth district	Julius S. Walsh
Thirteenth district	J. W. Emerson
Fifteenth district	C. P. Cook

EX OFFICIO.

Governor	W. J. Stone
Superintendent of Public Schools	L. E. Wolfe

The State Veterinarian, Dr. T. J. Turner, and the Board's secretary, Ida L. Crume, were also present.

The minutes of the previous meeting were, on motion, dispensed with, and business immediately entered upon.

Judge J. W. Emerson stated that the quarantine line adopted by the Board of Agriculture in the past had coincided with that established by the General Government, and made a motion that the line defined by the Bureau of Animal Industry, Department of Agriculture of the Federal Government, be adopted as the quarantine line for Missouri.

Motion was seconded by D. A. Ely.

In the discussion following, the State Veterinarian said he would advise to amend the line, if practicable, by including the border counties of Arkansas.

Alex. Maitland and J. Y. Fulbright referred to permits having in the past been granted to drive cattle from these counties during the quarantine season.

The Veterinarian stated that permits to drive cattle from those counties had, on rare occasions, been granted, but the practice was advised against.

N. J. Colman expressed the opinion that a State quarantine line at variance with that of the National Government would create some friction.

Judge Emerson's motion was then put and adopted.

The Veterinarian read the regulations recently adopted by the United States Department of Agriculture, and the members of the Board discussed the State regulations.

On motion of N. J. Colman, the formulated regulations were adopted, to take effect April 1, 1893, and 500 copies ordered printed.

On motion of His Excellency, Governor Wm. J. Stone, seconded by H. C. Ireland, the regulations were referred to the Secretary and the State Veterinarian to be prepared for publication.

The quarantine line defined and the regulations adopted are set forth in the accompanying

PROCLAMATION BY THE GOVERNOR.

By authority vested in me, and in accordance with section 8785 of the Revised Statutes of 1889, I, William J. Stone, Governor of Missouri, having approved of the following quarantine regulations adopted by the State Board of Agriculture for the purpose of preventing the spread of contagious diseases among cattle, do hereby promulgate same, and order that the same be observed and enforced throughout the commonwealth.

The following quarantine line has been defined and established, to wit:

All that country lying east and south of a line commencing at the southwest corner of the county of Pecos, State of Texas, on the Rio Grande river; thence following the western boundary of Pecos county to the southeast corner of Reeves county; thence following the boundary line between the counties of Pecos and Reeves to the Pecos river; thence southeasterly following the said Pecos river to the northwest corner of Crockett county; thence easterly along the northern boundaries of Crockett and Schleicher counties to the southeastern corner of Irion county; thence northerly along the eastern boundary of Irion county to the northeast corner of said county; thence northerly to the southern boundary of Coke county; thence westerly to the southwestern corner of Coke county; thence northerly along the western boundary of Coke county to the southern boundary of Mitchell county; thence easterly to the southeast corner of Mitchell county, and thence northerly along the western boundaries of Noland and Fisher counties to the southern boundary of Kent county; thence easterly along the southern boundary of Kent county to the southwestern corner of Stonewall county; thence northerly along the western boundary of Stonewall county to the southeastern corner of Dickens county; thence easterly along the northern boundary of Stonewall county to the southwestern corner of Knox county; thence northerly along

the western boundaries of Knox and Hardeman counties to the Red river; thence northwesterly following the Red river to its point of intersection with the one hundredth meridian of longitude; thence northerly from said point of intersection along said one hundredth meridian to the southern boundary of the State of Kansas; thence easterly along the southern boundary of the State of Kansas to the northeast corner of the Indian Territory; thence southerly along the eastern boundary of the Indian Territory to the southwest corner of the State of Missouri; thence easterly along the southern boundary of the State of Missouri to the Mississippi river; thence running southerly along the Mississippi river to the southwestern corner of the county of Lauderdale, State of Tennessee; thence running easterly, following the southern boundaries of the counties of Lauderdale, Crockett, Gibson, Carroll, Benton, Perry, Lewis, Maury, Marshall, Bedford, Coffee, Grundy and Sequatchie, to the southwest corner of Hamilton county; thence northerly along the boundary line between the counties of Sequatchie and Hamilton to the southwest corner of Rhea county; thence easterly along the southern boundaries of the counties of Rhea, Meigs, McMinn and Monroe, State of Tennessee, to the eastern boundary of said state; thence following the northern boundaries of the counties of Cherokee, Macon, Jackson, Transylvania and Henderson, State of North Carolina, to the southeast corner of the county of Buncombe of said state; thence in a northeasterly direction following the Blue Ridge mountains to the southwestern corner of the county of Amherst, State of Virginia; thence southeasterly along the southern boundary of the county of Amherst to the western boundary of the county of Appomattox; thence northeasterly along the eastern boundaries of the counties of Amherst, Nelson and Albemarle to the southern boundary of the county of Orange; thence along the southern boundary of the county of Orange to the boundary line of the county of Spotsylvania; thence along the eastern boundary of the county of Orange to the southern boundary of the county of Culpeper; thence easterly along the southern boundaries of the counties of Culpeper and Stafford to the boundary of King George county; thence northerly along the eastern boundary of Stafford county to the Potomac river; thence following the Potomac river southerly to the Chesapeake bay; thence easterly along the southern boundary of the State of Maryland to the Atlantic ocean.

First—From April 1 to the first of December, each car carrying cattle in course of transportation from south of said line and within said area, into or through the State of Missouri, shall bear a placard setting forth plainly and in bold letters that said car contains southern cattle, and when said cattle shall be unloaded north or west of the above described line to be fed or watered, the places occupied by the animals shall be considered infectious grounds, subject to quarantine, and shall be immediately set apart by the owners or lessees of the property for the accommodation of infectious southern cattle; no other cattle shall be admitted thereto.

At points of destination said cattle shall also be placed in separate southern cattle-pens, as prescribed in section fourth of these regulations.

Second—Whenever any cattle that have come from said area shall be reshipped from any of the points at which they have been unloaded to other points of destination, the car carrying said animals shall also bear a placard stating that said car contains southern cattle, and each of the way-bills of said shipment shall have a note upon its face with a similar statement. At whatever point in Missouri these cattle are unloaded, they also shall be placed in separate southern cattle-pens, to which no other cattle shall be admitted.

Third—Cattle from the above described area shall not be transferred on foot into or through the State of Missouri from April 1, 1893, to December 1, 1893.

Fourth—All the public, railroad or other stock-yards which shall keep or receive southern cattle for trade or transit within Missouri, shall provide for use, between April 1 and the first of December, 1893, a sufficient number of pens to be used exclusively during that period for the accommodation of cattle coming from within the territory above described. Such pens shall be marked or designated by reasonably large signs, conspicuously posted, and bearing in plain and large letters the words "Southern cattle-pens." And all public stock-yards shall, before April 5, next, file with the State Veterinarian an affidavit, setting forth clearly that they have complied individually with this section of the rules and regulations.

Fifth—Cattle coming into Missouri from territory within the above described boundaries shall not, during the period aforesaid, be kept, grazed or watered on public ranges, unfenced lands, highways, State lands, or within the corporate limits of any town or city, within the State of Missouri, unless quarantined in accordance with article 3, chapter 167, Revised Statutes 1889.

Sixth—The State Veterinarian shall, as far as practicable, co-operate with the United States Department of Agriculture in the enforcement of the regulations prescribed in its circular letter of February 15, 1893, addressed "To the managers and agents of railroad and transportation companies of the United States, stockmen and others," the object of which is to prevent the spread of Texas fever, in which the following directions for disinfection are set forth:

The cars used to transport such animals, and the pens in which they are fed and watered, and the pens set apart for their reception at points of destination, shall be disinfected in the following manner: (*a*) Remove all litter and manure. This litter and manure may be disinfected by mixing it with lime, diluted sulphuric acid, or, if not disinfected, it may be stored where no cattle can come in contact with it until after December 1. (*b*) Wash the cars and the feeding and watering troughs with water until clean. (*c*) Saturate the walls and floors of the cars, and the fencing, troughs and chutes of the pens with a solution made by dissolving four ounces of chloride of lime to each gallon of water, or disinfect the cars with a jet of steam under a pressure of not less than 50 pounds to the square inch.

Seventh—The State Veterinarian may appoint deputies and inspectors to aid him in the enforcement of the above regulations, and they are hereby empowered to quarantine, under such rules as may be prescribed by the State Veterinarian, all cattle brought into the State in violation of these regulations.

NOTE.—These regulations are adopted by authority of section 8785, Revised Statutes of Missouri, 1889, and if approved by the Governor, the same section provides a penalty for violation of a fine of not less than $1000 nor more than $10,000 for each and every offense, to be recovered in any county into or through which such stock is brought.

Sheriffs and constables in Missouri are hereby directed to enforce these regulations, and to arrest any and all parties who may be guilty of violation thereof.

In witness whereof, I have hereunto set my hand and caused to be affixed the great seal of the State of Missouri, this 21st day of March, A. D. 1893.

By the Governor: WM. J. STONE.

[SEAL] A. A. LESUEUR,
Secretary of State.

President J. A. Potts called attention to the appropriation made by the 37th General Assembly for the maintenance of the Veterinary service for the next two years.

The State Veterinarian made a brief statement of the absolutely necessary expense, and said the $10,000 appropriated for the service would not meet the expenditure.

The Board discussed and deplored the reduced appropriation, and Governor Stone expressed his willingness to transmit to the Senate and House of Representatives in a special message the views of the Board.

N. J. Colman offered the following resolution, which was unanimously adopted:

Resolved, That it is the opinion of the State Board of Agriculture that the appropriation for the Veterinary service of the State for the prevention and extirpation of contagious diseases in domestic animals should not be less than $20,000 for two years, exclusive of any sum for condemned animals, and that the General Assembly be respectfully solicited to appropriate said sum.

There being no further business before the Board, the meeting adjourned.

March 21, 1893.

To the Senate and House of Representatives:

I have the honor to transmit herewith a resolution adopted by the State Board of Agriculture at a meeting held in this city today. The meeting was attended by every member of the Board save two, and the resolution referred to was unanimously adopted. The purpose of the Board meeting today was to adopt quarantine lines for the protection of the live-stock of the State from infectious diseases. The danger of the introduction of such diseases resulting from the shipment of Southern cattle into the State is manifest. The Agricultural Department of the United States has defined quarantine lines, which lines were adopted by the Board of Agriculture at the meeting today. Quarantine rules and regulations have likewise been adopted, and will be immediately promulgated in compliance with the statutes of the State. If these regulations are to be enforced, and the live-stock interests of the State protected from the danger menacing them, it is absolutely necessary that agents or inspectors should be appointed to represent the State at the principal points where Southern cattle are received and distributed. There are at least three points where agents or inspectors should be located, viz.: St. Louis, Kansas City and Hannibal. It would be well to have one at the city of St. Joseph also. It will be necessary to maintain these inspectors during the quarantine period, which will continue until December 1.

Now, I assume that a competent man cannot be had for this service for much, if any, less than $100 per month. If we should have only three of them it would amount to probably $300 per month, or $2400 for the eight months prescribed as the quarantine period. If an inspector should be placed at St. Joseph, that would, of course, increase the amount necessary for this service. Now, the sum of $5000 per year only has been provided by the bills passed or pending for the veterinary service. One-half of that sum will, therefore, be required to compensate the

agents or inspectors employed to enforce the quarantine regulations of the State. The remaining one-half will be wholly absorbed by the salary of the State Veterinary Surgeon, which is $2500 per annum. The entire appropriation provided for will, therefore, be exhausted in paying the salary of the State Veterinarian and the necessary quarantine inspectors. There will be nothing left, therefore, to meet any other demand upon this service, except the sum of $7500 appropriated to pay for slaughtered animals.

The law requires the State Veterinary Surgeon or his deputies to make such inspections as the Governor may direct from time to time within or without the State, and also to inspect live-stock afflicted with infectious or contagious diseases, and to do a number of things deemed important for the protection of the live-stock interests of the State. No appropriation whatever is made for this service, or at least there will be no fund left to meet the expenses of this service if the quarantine regulations of the State are at all adequately enforced.

This is certainly a matter of very considerable importance to the State, and I do not believe the General Assembly should adjourn without making ampler provision for this service. It is altogether probable an amendment can be made to some bill pending to meet the necessities of the case, without the delay necessary to the introduction and passage of a bill entirely new and distinct. But in any event, I hope the General Assembly will concur, as I do, with the Board of Agriculture as to the necessity of taking some additional action in this behalf. I suggest an amendment to some of the pending appropriation bills, providing, say $5000 salary for the State Veterinarian and $3000 to pay expenses of enforcing quarantine regulations. If this can be done, then the $10,000 already embraced in the bills which have been passed or are pending can be used for other purposes incident to the service. But whether this suggestion be adopted or not, I wish, as I have said, to urge upon your attention the importance of some action.

WM. J. STONE, Governor.

Resolved, That it is the opinion of the State Board of Agriculture that the appropriation for the Veterinary Service of the State for the prevention and extirpation of contagious diseases in domestic animals should not be less than $20,000 for two years, exclusive of any sum for indemnity for condemned animals, and that the General Assembly be respectfully solicited to appropriate said sum.

COLUMBIA, MO., Jan. 15, 1894.

State Board of Agriculture:

We, the Board of Examiners of the Agricultural college and Experiment station, appointed for this purpose at meeting for reorganization that was convened in Columbia, Mo., July 20, 1893, after having made such an investigation as we deem to be required by the law, submit the following report of our work.

During the examination, we had frequent interviews with Judge Rothwell, President of the Board of Curators, Dr. Jesse, President of the University, and Dr. E. D. Porter, Dean of the Agricultural college and director of the Experiment station. These gentlemen treated your Committee with much consideration, and extended an invitation to examine with care and in detail the departments and the books of the Institution.

Upon invitation from the Board of Curators, your Committee and a part of the Board of Agriculture met them in session at their office, where President Rothwell gave an extended resume of the organization and work of the Agricul-

tural college and Experiment station, what they were doing and proposed to do in the future. President Rothwell spoke of the law creating these departments and what the records and books of the University would show they were doing for them.

The books of the college and Experiment station, which we found kept in a concise and intelligible manner, were laid before us, and their secretaries placed at our service, with instructions to afford us every facility for obtaining such information as we might call for.

After an examination as careful as we deemed necessary, we feel it our duty to say that we believe the general management of these departments to be able, thoroughly efficient and devoted to building and maintaining an Agricultural College and Experiment Station creditable to our State, affording ample opportunities for educating our young men, and preparing them for the progressive age of today.

Some of the professors and tutors paid in whole or in part from Agricultural College funds are giving a part of their time to the Academic course; but we find other professors and tutors paid wholly from University funds are giving instruction in the Agricultural College course, and upon the whole we believe the apportionment of salaries amongst the different funds is as fair and equitable as it would be possible under the circumstances to make it, and we are confident that in this matter no injustice is intended to the College, nor do we believe any will result.

In 1891 the College of Agriculture and Mechanic Arts was reorganized, with its own Faculty, course of instruction, and ample rooms and other facilities were provided. As a result of the fire in 1892, this department, in common with all others, was for a while sadly in need of rooms, but since the completion of the new Department buildings, sufficient and ample quarters have been furnished and every room in the Agricultural College building, better known as the Scientific building, is now used for Agricultural students.

The Manual Training building, erected at the cost of $30,000, out of University funds, for and now in use by the Agricultural College, was the first of the new buildings contracted, completed, equipped and used, and is now filled with earnest and enthusiastic Agricultural students, preparing for the duties of citizenship and a life of progressive agriculture. In the year '91 and '92 the University catalogue shows that the number of students receiving instruction in the College of Agriculture and Mechanic Arts was 205; for '92 and '93, 343, and for '93 and '94 the increase is in excess of former years. This, when we consider the depressed condition of finance during the last season, is, to say the least, a creditable and satisfactory showing, and is certainly commendatory of the management of this department of the University.

There are matters in connection with the College of Agriculture and Mechanic Arts that have been canvassed, discussed and investigated by committees, by the Legislature, and ventilated through the press, until it would seem that the public should be thoroughly familiar with all details, and your committee does not deem it necessary to renew the investigation or to reiterate what has already been said. Judge Emerson, in a very able report, submitted last year and published in the 24th report, has carefully considered these questions, and to his report we beg to refer all who seek information, or are inclined to discuss these matters.

The Board of Curators, confident that progress in the improvement in live-stock is not at an end, believing that by careful selection and judicious mating of improved blood and most perfect individuals, it is possible to do as much for the present as Bates, Collings and others did for the past, are keeping at the expense of the Experiment Station herds of improved cattle, hogs and sheep.

In this opinion of the Curators and their objects and aims we fully concur. The field for improvement, progress and advancement is always open, and there is no reason why Missouri may not occupy an advanced position in this work. But we are constrained to believe that the present herds, their condition and previous management, are not such as to encourage us to expect favorable results.

In this progressive age time is too precious to commence where breeders were 50 years ago. The people have no interest in a repetition of experiments, the results of which have long since been determined. If the amateur in stock-breeding improves an inferior animal, it is commendable; but to develop and improve only the best is worthy the careful consideration and determined effort of a great State like this. To make more and better meat for less money than heretofore, no experiment should be considered costly, and might well demand the deepest thought of the best intellect and the careful management of skilled hands. In our opinion each herd should be reduced in number and improved in quality. No animal should be kept whose breeding could not be substantiated: that is, not bred in the most approved and desirable lines, and that as an individual could not be creditably exhibited in competition with the best animals in the Mississippi valley.

All animals not up to a high standard of excellence, both in breeding and individuality, should be sold without reserve, and the proceeds used to build up a more creditable herd.

The dairy cows should be reduced in number, the herd improved by culling out such as are least profitable and mating the females with the best butter-producing strains. The careful weighing and testing of the milk, noting the kind, quality and quantity of feed consumed in proportion to butter-fat produced, should be continued and reported through bulletins.

Would recommend that the entire herd of sheep be fatted and placed on the market for mutton, and that no more be purchased. We find them in no condition to be sold for breeding purposes, nor the pastures in condition to receive additional purchases.

We do not believe the experimental work being done in the Agricultural and Horticultural departments commensurate with the expenditures.

We are aware of the fact that the experiments are costly, that time, thought and care are necessary to make results of value. First the experiment is suggested, then the preparation, then it must be carefully conducted by skilled hands, every step must be noted, and accurate and detailed reports made of results.

We would not merely call attention to the fact that but few experiments have been reported in the past, but to the work now being done, to the limited number now being conducted, to a lack of preparation and the want of an organized effort in this direction.

We are assured by Dr. Porter, Director of the Station, that a new era is to dawn upon the work, and that a new and valuable series of experiments are to be inaugurated; that prior to this the funds have been deficient, but now there is an abundance, and that life and energy shall be infused into this work.

We are pleased to note that at your last meeting, and upon the suggestion of Dr. Porter, you named a committee whose duty it shall be to advise with the Director of the Station as to experiments in agriculture and horticulture, visit the farm, inquire into its management, the experiments being conducted, and make such suggestions in relation thereto as they might deem proper and of value.

We believe that the Horticultural department of the Station should enter upon a more extensive series of experiments, systematized and directed with a view of benefiting the practical horticulturist.

We would suggest that that part of the farm not used or needed for experimental purposes should be leased for pasture, and that general farming be discontinued.

The Station should at least issue the number of bulletins required by law, and might make such additional issues as may be necessary to give full and complete reports of all experiments conducted and work performed in that direction.

In conclusion, we would say that your committee has endeavored to conduct this investigation in a spirit of fairness and impartiality, avoiding unfriendly or unjust criticism, and trusting that our suggestions may be kindly received and appreciated as an effort to extend and render more valuable, rather than detract from the usefulness of, an institution in which we take much pride.

We believe that a grand future awaits this department of the University; that it will grow in favor and popularity with the people; will be a material aid in developing agriculture in this State, and result in more intense and hence more profitable farming; that it will have an elevating and refining influence upon the agriculturist and his calling, and aid him in recovering the exalted position to which he is entitled as a producer of the world's food supply, and will prepare and qualify him for active and progressive citizenship.

A great agricultural and horticultural State, upon which nature, with a lavish hand, has bestowed the most munificent gifts, a State whose possibilities may be revealed in the future, but cannot now be estimated, in order that the highest development should be reached, should be freely supplied with intelligent thinkers, versed in the science of agriculture and horticulture, qualified and equipped to make the heaviest drafts upon the valuable deposits of nature without exhausting or diminishing her capacity to respond.

Such citizens, such agriculturists, this college proposes to supply, and we have implicit confidence in the desire and ability to accomplish this great work.

With due respect, we beg to submit this report.

WALLACE ESTILL,
W. R. WILKINSON,
D. A. ELY,
Committee.

HON. J. K. GWYNN,
Executive Commissioner of Missouri World's Fair Board.

MISSOURI AT THE WORLD'S FAIR.

For much of the matter herein contained, for an active interest in getting this matter before the public, and for uniform kindness and courtesy to this office, we take pleasure in acknowledging our obligations to Hon. J. K. Gwynn.

To his energy and forethought, to his incessant labor and ceaseless devotion to the work, to his ability and management, is due in a great measure, no doubt, the proud position occupied by Missouri at the World's Fair and the phenomenal success of her exhibit.

In the November Bulletin for 1893, we gave a list of all awards made to Missouri and her exhibitors at Chicago that had been promulgated at that time. To fulfill a promise then made that we would, as early in the future as possible, publish a complete list of awards, with cuts of winning live-stock, we now present this Bulletin. Delay has been occasioned in getting cuts of stock, reports from superintendents of departments, and at this date we go to press without cuts and matter that we would have taken pleasure in presenting to the public.

We do not believe our exhibit was what we could and ought to have made it. Our people, seemingly content with their surroundings, happy in their homes, and satisfied with their prospects, had apparently but little interest in the world's greatest show.

They, possibly on account of the slanders and libels that have been so unjustly and incessantly hurled against the fair name of their State, were not eager, were perhaps timid, about participation in a great contest, where they were to enter into competition with the exhibits of the world.

But, conscious of the value of her productions, and a desire to contribute her mite to the success of a national enterprise, she entered the list, threw down the gauntlet in the face of the energy and progress of the world, and we now record the result.

We took more premiums than any other State, or any foreign nation on the globe.

Our exhibitors brought back to the State not only honors, ribbons and diplomas, but $35,000 in cash prizes.

In agriculture we took the award for the best "general and most varied exhibit."

We exhibited in abundance and of superior quality, the four great agricultural staples of America: corn, wheat, cotton and tobacco—showing a versatility of production not approached by any other State.

Our herbarium was awarded first prize, and was no doubt the equal of all other exhibits combined.

We were awarded 20 prizes on our pomological exhibit, and no fruit has awards on more points than ours.

We took our share of the awards in the Department of Mines and Mining, and the exhibit presented an exhaustive epitome of the mineral wealth of the State.

In saddle-horses, Berkshire hogs, Merino sheep, Angus cattle and mules, we led the world.

No other state in the Union, no country on the globe, can furnish three men who were awarded as many first and second premiums on live-stock as were Messrs. Estill, Gentry and Shattuck.

We took four of the most valuable awards in Forestry.

As evidence of the advanced position we occupy in educational matters, we took 38 prizes in this department.

In kindergarten work and penmanship we surpassed all other exhibitors, and in no particular suffered in comparison with others.

This is a part of what we did, and we still contend that we might and should have done more; but we are satisfied with the result and proud of our State; proud of her schools and churches, her honor and her credit at home and abroad, the energy, enterprise, intelligence and liberality of her people, her continued increase in population and wealth, her rich fields, fertile valleys, orchards, vineyards, forests of valuable timber, extensive areas of luxuriant blue-grass, and her mountains of iron and valuable deposits of mineral.

We are proud of her 40,000,000 acres, traversed by an immense system of railways and mighty rivers, kissed into smiles by the sunlight of heaven and melted into generous productiveness by her dews.

What has been done at Chicago is evidence of the fact that Missouri will be what her citizens make her, that her possibilities are unlimited, and that we dare not attempt to foretell the greatness of her future.

A Brief Synopsis of the Doings of the Missouri World's Fair Commission, from the Organization until the Close of the World's Fair.

On March 27, 1891, an act was passed by the Missouri Legislature, appropriating $150,000 for the purpose of making a creditable exhibit of the resources of the State at the World's Fair, and also, providing for the appointment of a Commission, consisting of seven members, under whose general direction the exhibits should be made. The bill also provided that immediately upon the organization of this Commission of seven, to be appointed by the Governor, that said Commission should elect an Executive Commissioner, whose duty it should be to collect the products, and make the exhibits under the direction of the Board. This measure was in entire keeping with the progressive administration of Governor Francis, and was heartily championed by him before the Legislature.

Shortly after the passage of the act, Governor Francis complied with its provisions by the appointment of the following individuals as members of the Commission, viz.: N. H. Gentry, Sedalia, Mo., Nathan Frank, St. Louis, Mo., Hugh J. McGowan, Kansas City, Mo., H. H. Gregg, Joplin, Mo., Charles W. Green, Brookfield, Mo., William Dawson, New Madrid, Mo., and Dr. E. McD. Coffey, Platte City, Mo.

The first meeting of the Commission was held in Jefferson City, Missouri, in July, 1891. At this meeting, an organization of the Board was effected by the election of N. H. Gentry, of Sedalia, for President, Honorable Nathan Frank, of St. Louis, for Vice-President, and Charles W. Green, of Brookfield, for Secretary. Dr. E. McD. Coffey was also elected Treasurer, but whether at this meeting or at a subsequent one, the writer does not call to mind at this time. The only changes in the *personnel* of the Board were occasioned by the resignation of Col. H. H. Gregg, of Joplin, in the spring of 1893, and the appointment by Governor Stone, of Frank Yale, of Joplin, as his successor. The only change occurring in the officiary of the Board took place in October, in 1892, when Charles Green resigned the position of Secretary, and was succeeded in that office by the Hon. William Dawson, of New Madrid.

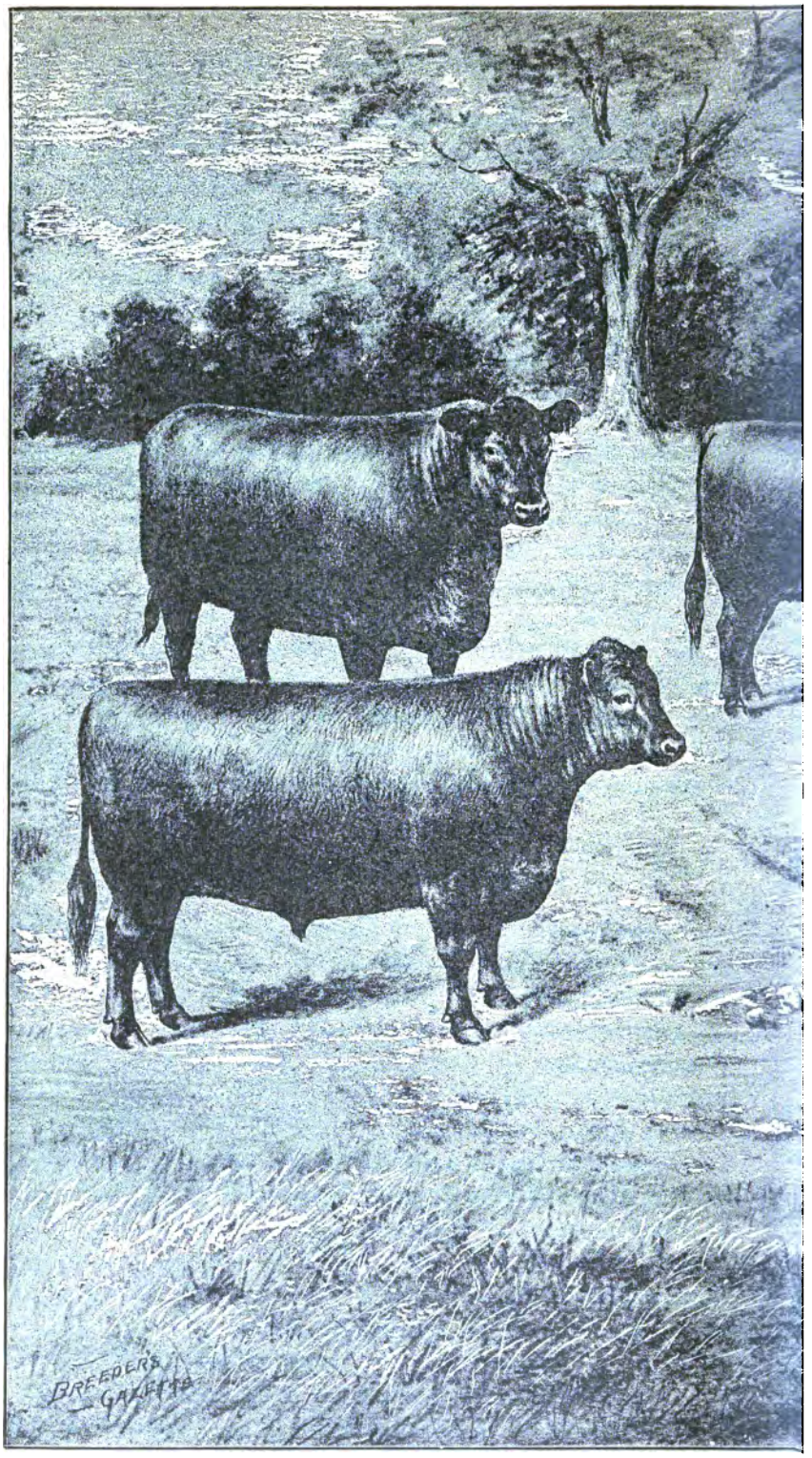
On September 2, 1891, J. K. Gwynn, of Versailles, Mo., was unanimously elected Executive Commissioner by the Board, and immediately installed in office. Preliminary preparations for the work undertaken by the Board were at once begun, and at the next regular meeting of the Board, held in Kansas City, in October, 1891, a general outline of what should be undertaken by the Board, and how best it could be put into

execution, was submitted. At a subsequent meeting of the Board, a division of the appropriation into departmental funds was made: that is to say, it was practically determined upon, how much money should be expended in making each of the great departmental exhibits for the State. The allotment was as follows: For State building, $35,000; for live-stock, $20,000; for crop exhibit, $5000; for horticultural exhibit, $10,000; for mineral exhibit, $15,000; for the educational exhibit, $6000; for forestry exhibit, $5000. At a subsequent date the following funds were set aside: For wool and dairy exhibits, $1000; for bird exhibit, $1000; for fish exhibit, $900.

It having been definitely determined the amount of money available for each of the exhibits to be made by the State, active preparations from this time on were prosecuted for the accomplishment of the desired results. Every agency in the State that could be brought into requisition to facilitate this purpose was appealed to. The Executive Commissioner visited in person the presidents of the various organizations of the State, such as the State Horticultural Society, the State Dairy Association, the State Board of Agriculture, etc., etc. He also met with these organizations in their regular annual meetings during the year 1892, and secured promises of aid and co-operation. The work thus having been organized in a general way, it can best be considered by taking it up by departments.

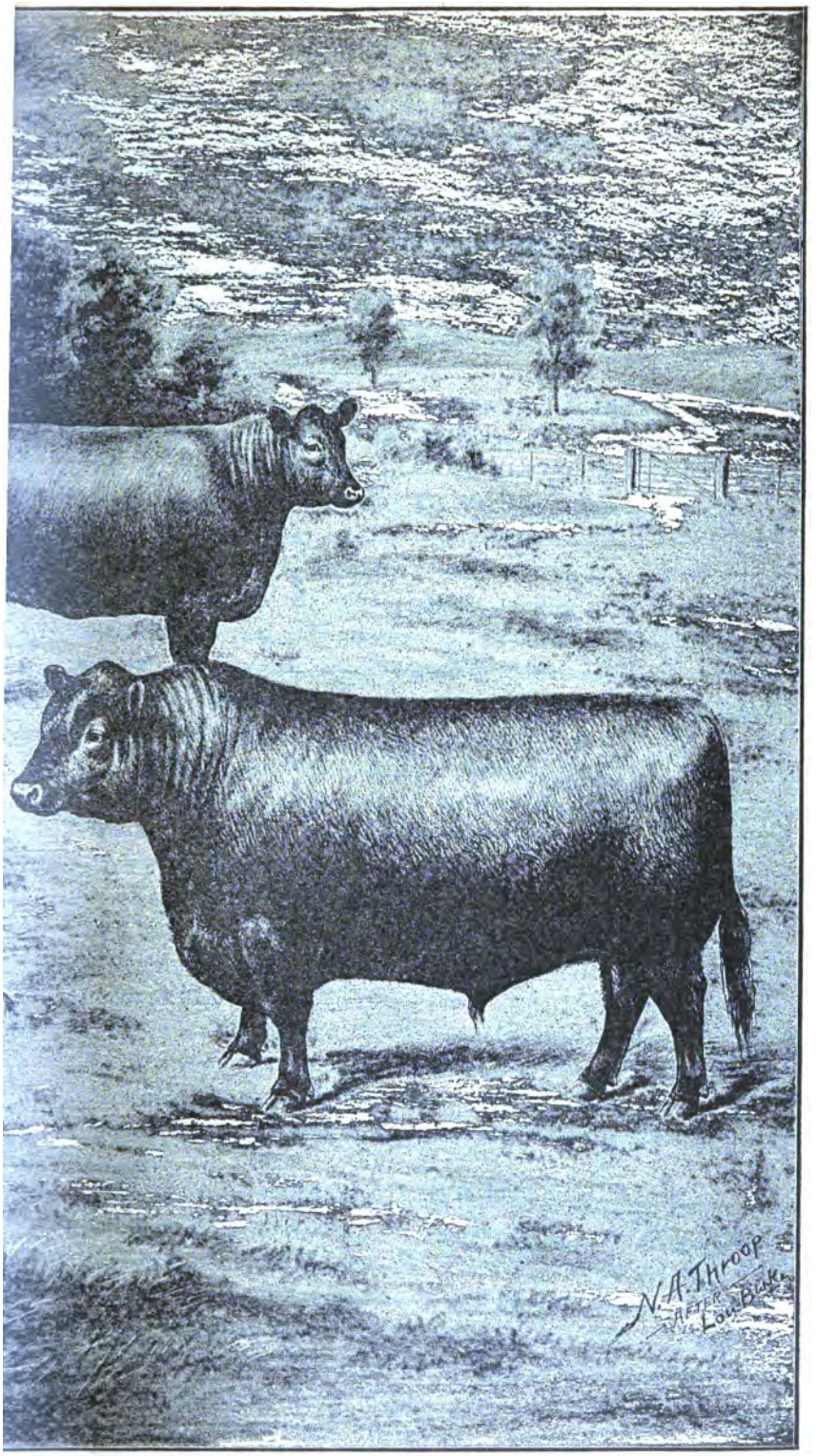
DEPARTMENT OF AGRICULTURE.

The agencies employed for securing the agriculture exhibit for the World's Fair were both numerous and varied. In the first place, the Executive Commissioner met with the State Board of Agriculture in Columbia, in January, 1892, and secured promises of individual and collective aid and co-operation from that body and the members thereof. An appeal was published through the "Agriculture Bulletin," published under the auspices of the State Board of Agriculture, to the farmers of the State to make a special effort in raising agricultural specialties for the Fair. The farmers of the different portions of the State adapted to different kinds of products were appealed to to spare no effort to produce the best products of which their localities were capable for exhibition at the World's Fair. They were requested to make specific promises to raise given articles, in order that the Board might have something tangible upon which to depend. In order to facilitate this matter, blank forms were prepared, and sent to all who would agree to undertake the raising of a specialty. More than 100 of these blanks were filled out by different individuals in all parts of the



ABERDEEN-A

Black Knight of Estill; Heather Lad, second; Maggie Estill; Maggie Estill, second. Property
in Chica



ɪGUS CATTLE.

of Wallace Estill, Estill, Howard county, Mo., and all prize-winners at Columbian Exposition go, 1893.

State, and pledging the indorsers to raise almost everything grown in the State. These were carefully filed away in the office of the Executive Commissioner.

Dr. E. D. Porter, Dean of the Agricultural College of the State, very kindly consented to undertake the raising of a large number of agriculture specialties for exhibition. These were to include not only products raised in a commercial way in Missouri, but also a large number of others, for the purpose of showing the versatility of the production of Missouri's soil.

The year 1892 proved to be one of the poorest crop years ever known in the State of Missouri, and but very few of the promises made by individuals throughout the State were fulfilled — various reasons being assigned by them for not being able to do so.

Dr. Porter was greatly discouraged in his efforts, owing to the incessant rains that prevailed until it was too late for planting many of the seeds that he contemplated; and at a later period, disastrous storms interfered with his endeavor. But the final showing made by him was very gratifying, as he succeeded in furnishing 120 varieties of wheat, 34 varieties of tobacco, all of superior quality, and many other things of interest.

When the harvest of 1892 began to ripen, collectors were put into the field with the beginning of the ripening of the harvest in Southern Missouri, and were moved systematically across the State in making agriculture collections of the State. The principal men utilized for this purpose were: W. R. Dodson, from University of Columbia, Mo., B. F. Bush, of Courtney, Jackson county, Mo., and William Bouche, of St. Louis. These parties went into the fields in the different parts of the State, and made selections from the ripening crops, tagging each specimen at the time it was secured, with the name of the producer, date of planting, date of harvesting, etc., etc. These specimens were all immediately forwarded to the ware-rooms of the Commission in St. Louis, where they were stored and cared for till the date of shipping to Chicago.

In addition to collections made in this way, a number of individuals throughout the State were enterprising enough to collect and forward specimens for exhibition. In North Missouri, Mr. B. F. Waters, of Ralls county, and Mr. Jno. T. Sitton, of Callaway county, rendered valuable assistance in making collections. Mr. Nicholas M. Bell, of the Peper Tobacco Warehouse Co., of St. Louis, rendered invaluable assistance in obtaining a collection of tobaccos. After these materials were all collected in the ware-rooms of the Commission in St. Louis, they were carefully gone over, straw by straw, and piece by piece, the

finest specimens selected, tied up in neat packages, labeled, boxed and forwarded to Chicago in car-load lots.

In the Department of Agriculture, Missouri occupied the largest space assigned to any one state or territory in the Union. It required a large number of show-cases, pavilions and pagodas to accommodate this exhibit, which was installed under the immediate supervision of William Bouche, of St. Louis. The striking feature of our exhibit was the fact that we exhibited in large quanties and of fine qualities, specimens of the four great staples of America, viz.: wheat, corn, cotton and tobacco. This, too, accounts for the fact that we got what I consider the most flattering award made in this department, viz.: the award for the "Best General and Most Varied Display," as will be seen from the records of the department of awards, copy of which has been sent you for publication.

Each of the exhibits made by the State had a custodian in charge under the direction of the Executive Commissioner. Captain W. A. White was appointed custodian of this exhibit, but was transferred to the live-stock department, and Mr. R. J. Coffey, of Platte City, was installed as custodian of the exhibit, and charged with the duty of explaining to visitors the various products on exhibition, and the adaptability of the soil of our State for varied agriculture pursuits.

LIVE-STOCK.

As before stated, the sum of $20,000 was set aside for the benefit of the live-stock industry of Missouri. This department, however, was managed differently from any of the rest. Instead of making a collection of live-stock of the different classes, and taking them to Chicago and exhibiting them, which would have been both impracticable and impossible, this money was distributed among all of the live-stock from Missouri that were exhibited at the Fair upon an equitable basis. The distribution of the fund among the different classes of stock was as follows: To horses, mules, jacks and jennets there was given 30 per cent of the amount; to cattle, 30 per cent; to hogs, 23 per cent; to sheep, 11 per cent, and to poultry 6 per cent. The disbursement of this fund among the live-stock exhibited at the Fair was regulated as follows:

First—Of the amount apportioned to each class, 25 per cent thereof was distributed among the exhibitors in such class, giving to each such a part at the whole of said 25 per cent as the number of animals exhibited by him was a part of the whole number of animals in such class, owned in the State of Missouri. This distribution was made im-

mediately following the arrival of the animals on the exposition grounds, and their acceptance by the live-stock committee, as competitors creditable to the State of Missouri.

Second—All prizes awarded to Missouri exhibitors of stock in the general competition for the various classes were duplicated from this fund—all sweepstake medals being valued for duplication at $100 each, and all diplomas at $25 each.

There were also some special prizes given, and a distribution made of the fund remaining in any class after the above named premiums were paid, giving to each in such class such a part of the remainder as the sum total of the prizes awarded to his stock in such class, both in Missouri state and general competition, was a part of the whole amount of prizes awarded in such class of stock from the State of Missouri.

The achievements of Missouri live-stock in some departments were phenomenal. This is especially true of Aberdeen-Angus cattle, Berkshire swine and Merino sheep. In these classes Missouri captured nearly everything. Mr. Wallace Estill, of Howard County, captured nine out of thirteen first prizes in this class. In the Merino sheep exhibit Mr. L. E. Shattuck, of Stanberry, captured twelve first prizes, and almost everything else, taking a total of more than fifty prizes. In Berkshire swine Mr. N. H. Gentry, of Sedalia, took ten first prizes, and a very large per cent of all others.

In sweepstakes for saddle stallion, any age, Missouri also carried off the first prize, which was captured by Mr. A. F. Wyckoff, of Appleton City.

In order to insure the best results to the State from the live-stock exhibit, it was found necessary to put a capable man into the field to work up interest in the matter, and to make explanations. For this purpose Captain W. A. White, of Plattsburg Mo., was selected, and he discharged his duties to the eminent satisfaction of the Commission, and with great credit to himself. He also rendered invaluable assistance to the Commission during the period of the live-stock show in Chicago.

Of the poultry division of the live-stock department, Mr. M. L. Andrews, of Sedalia, Mo., was made superintendent, and this exhibit, too, was both creditable and well managed.

It is the opinion of many well-informed persons that if no other remuneration should accrue to the State of Missouri from the expenditure of her appropriation, the benefits accruing from the department of live-stock alone would be ample remuneration for the entire outlay.

DEPARTMENT OF HORTICULTURE.

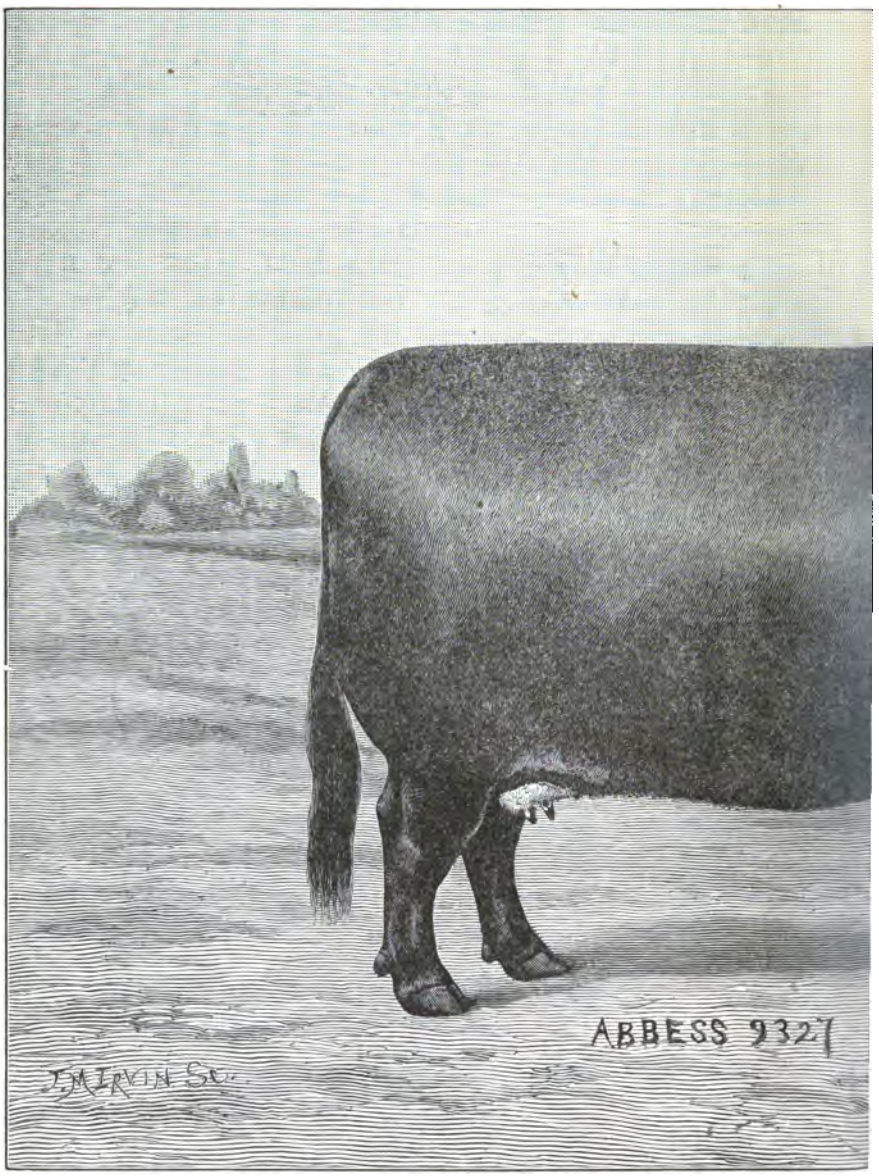
The effort of the State of Missouri in the department of horticulture embraced five exhibits, viz.: One pomological exhibit, one herbarium and three plant exhibits.

The herbarium was the largest and finest exhibited at the Fair, and contained about as many specimens as all of the other exhibits in the herbarium department combined. It was collected and prepared by Mr. B. F. Bush, of Courtney, Jackson county. It took the highest award of any herbarium exhibited at the Fair.

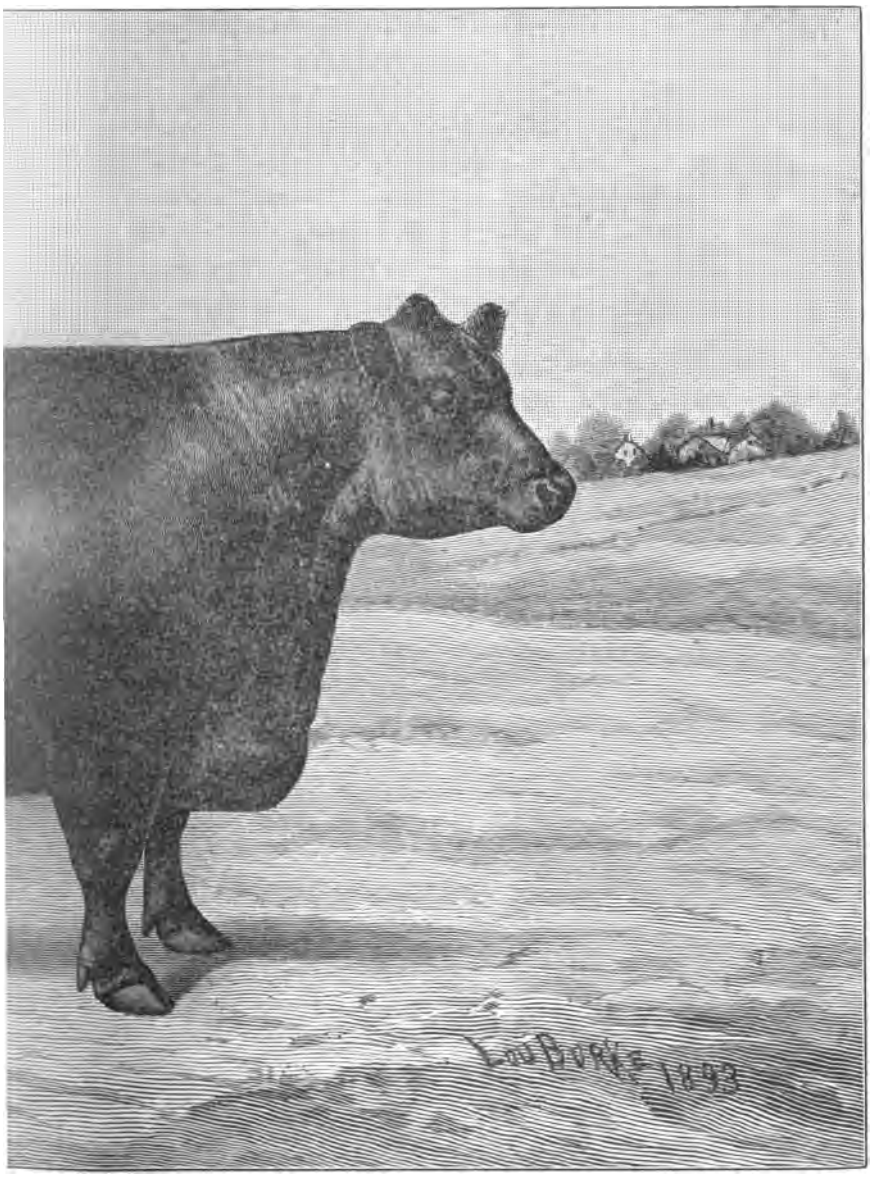
The materials composing the three floral exhibits were from the Missouri botanical gardens, and from the green-houses of St. Louis florists. Many of the specimens here exhibited were very superior, and an award was made to the exhibit collectively considered.

Popular interest in the State of Missouri, however, in this department, was centered on our fruit exhibit.

At the outset of the work, Mr. J. C. Evans, President of the State Horticultural Society, was appointed general superintendent of this exhibit, which alone guaranteed its success. Through his influence the co-operation of the representative horticultural people was readily secured. During the year 1892, specimens of all kinds of fruits grown in the State of Missouri were secured, and preserved in antiseptic fluids in handsome crystal glass jars to the number of about one thousand. This preserving was done by or under the immediate direction of Mr. Powell Jackson of St. Louis, and proved a great success. In the autumn of 1892, 141 barrels of apples were placed in cold storage in Chicago. These, together with the three collections of jar fruits above alluded to, and stored respectively in St. Louis and Olden, in Howell county, and at Columbia, Missouri, where quite a collection had been put up by Mr. Charles A. Keffer, professor of Horticulture in the State University, were ready for installing as an exhibit on the opening of the Exposition. Very handsome installation fixtures were prepared, extending entirely across the hall in which the fruit exhibit was made, and occupying more space than had been allotted to any other state in said hall. Through the agencies above alluded to, the State had the greatest abundance of fruits to fill the allotted space from the outset, which could be said of very few states making exhibits at the Fair. She not only had an abundance, but a very large surplus, and as our neighboring State of Kansas hadn't the fruits to cover the space allotted to her against the east wall of the hall adjoining the Missouri exhibit, on invitation of the State of Kansas, and with the permission of the Chief of the Department, this space also was covered with Mis-



ABBESS OF TURL
Champion cow over all beef breeds at Columbian Exposition



NGTON, NO. 9327.
1893. Exhibited by Hon. Wallace Estill, Estill, Howard Co., Mo.

souri fruits. As the fruits of the year 1892 began to ripen, the exhibit was replenished daily with the choicest specimens of all varieties that could be obtained in the State.

The installation fixtures for this exhibit were finished in white and gold, and when the fruits in the jars of assorted sizes above alluded to were artistically arranged, intermingled with plates of fresh fruit of all kinds, the exhibit proved to be one of the most attractive, if not the most attractive in the building, and the high standard established at the outset was maintained from start to finish.

In addition to the labors of Mr. J. C. Evans, the Superintendent of the Exhibit, invaluable services were rendered by Mr. L. A. Goodman, Secretary of the State Horticultural Society, and by Messrs. N. F. Murray and A. Nelson, Vice-President and Treasurer, respectively, of the same organization. The custodians immediately in charge of the exhibit, and under pay of the Commission, were Mr. E. L. Pollard and Mr. J. C. Evans, Jr. The duties of this position were very onerous but were faithfully discharged in every detail.

This large and varied display of fruits from Missouri served to stimulate an increased popular interest in the possibilities of commercial orcharding in our State, and in the opinion of the writer, the largest and most gratifying immediate returns from Missouri's effort at the Fair will be in the enhancement of the value of those lands best adapted to fruit-growing, and an immediate and very large expansion of the fruit-growing interests of the State.

MINES AND MINING.

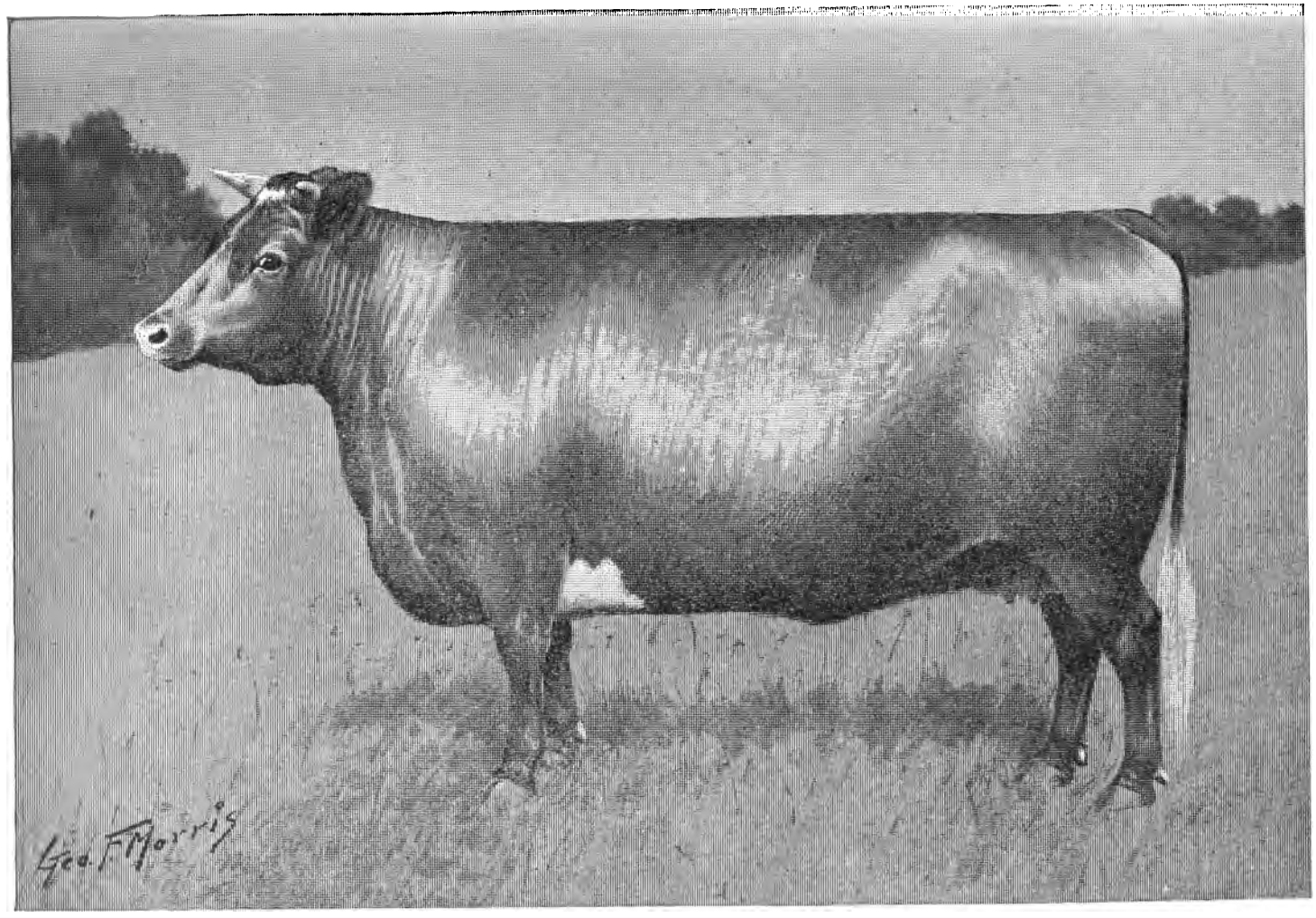
Much was to be expected of the State of Missouri in the department of Mines and Mining, and these expectations were not disappointed. This part of the work was undertaken with enthusiasm from the outset, and jointly prosecuted by the Commission and by the State Bureau of Geology, under the direction of Professor Arthur Winslow, State Geologist. At an early stage of the preparation of this exhibit, it was found necessary to have a capable superintendent for the work, as Professor Winslow could not give it the time and attention as an expert, that its best interests demanded. Dr. E. O. Hovey was selected for this position, which he held until after the exhibit was installed in Chicago, when he tendered his resignation. Mr. James A. Reeves of Joplin was appointed as a special collector of zinc and lead specimens in the southwestern mineral district of the State, and on the resignation of Dr. Hovey, succeeded him as Superintendent of the Mineral Exhibit. The selection of Dr. Hovey proved a most admirable one, as the high character of the exhibit arranged under his direction sub-

sequently demonstrated. Confidence in our effort in this department was inspired by the energetic manner in which our work was prosecuted, and Mr. Skiff, the Chief of the Department of Mines and Mining, contrary to all expectations and even surpassing our own hopes, assigned to the State of Missouri one of the four choicest positions in that building. There were two main aisles running through the building, one east and west and the other north and sonth, and the four corners thus made at the center of the building by the intersection of these two aisles were by great odds the choicest to be had, and one of these was assigned to Missouri. Around the space so assigned an imposing facade was erected, consisting of a base of granite, a screen wall of Roman brick, and a superstructure of terra cotta, consisting of a series of columns, which in turn were surmounted by a cornice of wood-work, handsomely carved. Inside of this enclosure there was installed an exhaustive exhibit of all the minerals known to our State, together with full sets of the milling products resulting in the process of manufacture, and also specimens of the net metallic product. In this exhibit both cabinet and commercial exhibits were made in the departments of our most important commercial ocres.

Among the most attractive specimens of ore exhibited here may be mentioned a specimen of galenite, or crystalized lead ore, weighing 6500 pounds; also a specimen of almost pure rosin jack, weighing 1600 pounds. There was also a specimen of disseminated galenite, weighing 4500 pounds. An interesting feature of this exhibit was a topographical map of the State, showing the distribution of the ore-bearing formations of the State. Another very interesting feature of this exhibit was a model of the St. Joseph Lead Works at Bonne Terre, Mo., the largest in the two Americas, and the third in size in the world. The exhibit was also abundantly supplied with statistical information, models showing the mode of occurrence of the ores of our State, etc.

The Iron Mountain Company furnished a very interesting model of the famous Iron Mountain mine, showing how the ore had been mined, and the mode of occurrence in the formation of the mountain alluded to.

In addition to those materials that were collected and installed by the Commission, there were a large number of very valuable loan exhibits furnished by enterprising firms and individuals of the State of Missouri, among whom may be mentioned the Geological Survey of the State of Missouri, Washington University of St. Louis, Prof. W. B. Potter of St. Louis, B. F. Graves of Doe Run, the St. Joseph Lead Company, Bonne Terre, the Empire Zinc Company and the Picher Lead Company of Joplin, Mo., the Scarritt School of Kansas City, and numerous other enterprising institutions and individuals.



SHORT-HORN HEIFER, DORA 6th.

In this department the most casual observer could not fail to notice that two ideas of making exhibits were prevalent. The one was the piling up of meaningless masses of material for the sake of impressiveness, and the other was an exhaustive presentation of the mineral resources of a locality through specimens, models, maps and statistics. The State of Missouri adopted the latter method, and in so doing presented a complete epitome of her mineral wealth, and the writer is gratified to state that she was more than once complimented on the tasteful and excellent showing made for her in the installation of her exhibit. Many of these compliments came from high sources, such as Prof. Clark of the United States Geological Survey, and from the Professor of Geology in the Chicago University, In fact, so numerous and so flattering were these compliments, that we laid claim before the jury of awards for the best installation in the building; but as no competition of this kind was allowed, no award could be made, and hence no conclusion arrived at, so far as what the action of the judges might have been in the premises. The number of awards made to the State, however, is gratifying evidence that those who had the matter in charge were the right men in the right places.

FORESTRY.

The space allotted to Missouri for a forestry exhibit was not in keeping in point of magnitude with the allotment that had been made in the other departments; but the Exposition management had been so liberal with the State in all other departments that we could not consistently raise very strenuous objections to our treatment here. In fact, it seemed impossible for the Exposition management to understand how it was possible for any one state to be possessed of such a wonderful endowment of material resources as would enable her to occupy the amount of space that we were demanding in so many departments, and not until our exhibits began to pour in on them did they fully realize that we were not over-sanguine as to our actural needs. We only had in this department about one-half of the space that we had materials to fill, but the exhibit was one among the most interesting in the building, and among the points of interest may be mentioned the following:

First—We exhibited over 170 varieties of *ligneous flora.*

Second—We exhibited specimens of commercial timber of unusual size and quality.

Third—We exhibited a large number of discs of trees of commercial value of abnormal growth.

In comparison with other states, it may be said that the Missouri exhibit was noted for exhibiting the largest discs of burr-oak, red-oak, cypress, pecan, ash and sassafras that were exhibited at the Fair.

These specimens composing the exhibit may be classified as follows: Cross-sections or discs of unusually large growths, sections of ordinary commercial sizes—six feet long—and sections of the small *ligneous flora* of the State. The discs of the large growths were of unusual size and interest, and were procured at the expense of great labor and difficulty. This work was done by Mr. R. A. Dawson, of New Madrid, Missouri. The discs of ordinary commercial sizes, and covering a large variety of timbers, were collected by Mr. W. R. Dodson, of the University of Missouri, and were cut so as to show radial, tangential, obliques and transverse surfaces. These surfaces were dressed and polished, and one-half of each exposed surface was varnished. The collection of small *ligneous flora* was made by Mr. B. F. Bush, of Courtney, Missouri.

In addition to these log sections, a board of each of the kinds of commercial timbers exhibited was dressed, polished and varnished, in order to show the economic adaptabilities of these various kinds of timber, and all in all the exhibit was a very forceful presentation of the forestry resources of the State of Missouri.

Mr. R. A. Dawson of New Madrid, Mo., was the custodian of this exhibit, and his intimate knowledge of lumbering, and of the forestry resources of the State, coupled with his obliging and genial disposition, made him a very efficient man for the place.

EDUCATIONAL.

When the active work of preparing the Missouri exhibits was inaugurated, the importance of no one subject so deeply impressed all parties concerned as that of making a satisfactory educational exhibit, and one that would correctly represent the status of educational interest and educational facilities in the State of Missouri; but the friends of education, not alone in Missouri, but everywhere else, were very much discouraged by the dilatory tactics of the World's Fair management in making provision for such an exhibit. A vain endeavor was made to procure a separate building for these exhibits; failing in this, space was set aside in first one place and then another for the educational exhibits, until it appeared that no provision at all would be made. But just about two months before the Fair opened, the management definitely located the educational department in the galleries of the Manufactures and Liberal Arts building. The location was by no means satisfactory, and the time was far too short to do

this department justice; but the friends of education went to work with a will, and in the short time at the disposal of the Commission, a splendid exhibit was prepared and installed.

In the prosecution of this work the co-operation of Prof. L. E. Wolfe was secured, and with the facilities at his command a "vigorous shelling of the woods" was commenced for materials with which to make the exhibit. Prof. E. H. Long, superintendent of public schools of St. Louis, and Prof. I. C. McNeill, assistant superintendent of schools in Kansas City, rendered invaluable assistance in determining the general character and scope of the exhibit, and in preparing exhibits themselves, and in encouraging others to do so. Very handsome and attractive installation fixtures were procured, and a conspicuous place in the space allotted for educational exhibits was secured, and in due time an exhibit on a par with the very best at the World's fair was installed from Missouri. Prof. J. T. Ridgeway of Kansas City, became the very efficient and zealous custodian of this exhibit, ably assisted by his good wife. In the latter part of August, Prof. Ridgeway, being compelled to return to his duties in Kansas City, left the exhibit in charge of Mrs. Ridgeway, who discharged the duties of the position to the eminent satisfaction of the Commission, and won laurels for the State and credit for herself by the faithful and zealous manner with which she looked after every detail of Missouri's educational interests.

A feature of interest in connection with this exhibit was a very large map made specially for the purpose, and showing the location of every school-house in the State. The two features of this exhibit, however, which attracted special attention, and in which we were conceded superiority over every other educational exhibit at the Fair, were in the departments of Kindergarten and Penmanship.

The number of awards captured by this exhibit will doubtless be gratifying to all the friends of education in our State, and will be conclusive proof that Missouri was creditably sustained in this department, as compared with other states and countries.

WOOL, DAIRY, FISH AND BIRD EXHIBITS.

In addition to the large exhibits above enumerated, there were a number of exhibits of minor interest of great importance. Among these may be mentioned:

The Wool exhibit, made in the galleries of the Agricultural building. This exhibit was noted for containing the largest fleece of wool on exhibition at the World's Fair. It was the fleece of the Merino ram, Challenge, owned by L. E. Shattuck, Stanberry, Missouri, and weighed, when shipped to Chicago, 43½ pounds. Mr. Shattuck had 12

fleeces on exhibition, and there were about 24 other fleeces, principally Merino, Southdown, Cotswold and Oxforddown. The two prize winners in this department were Mr. L. E. Shattuck, of Stanberry, Missouri, and Mr. G. B. Bothwell, Breckinridge, Missouri.

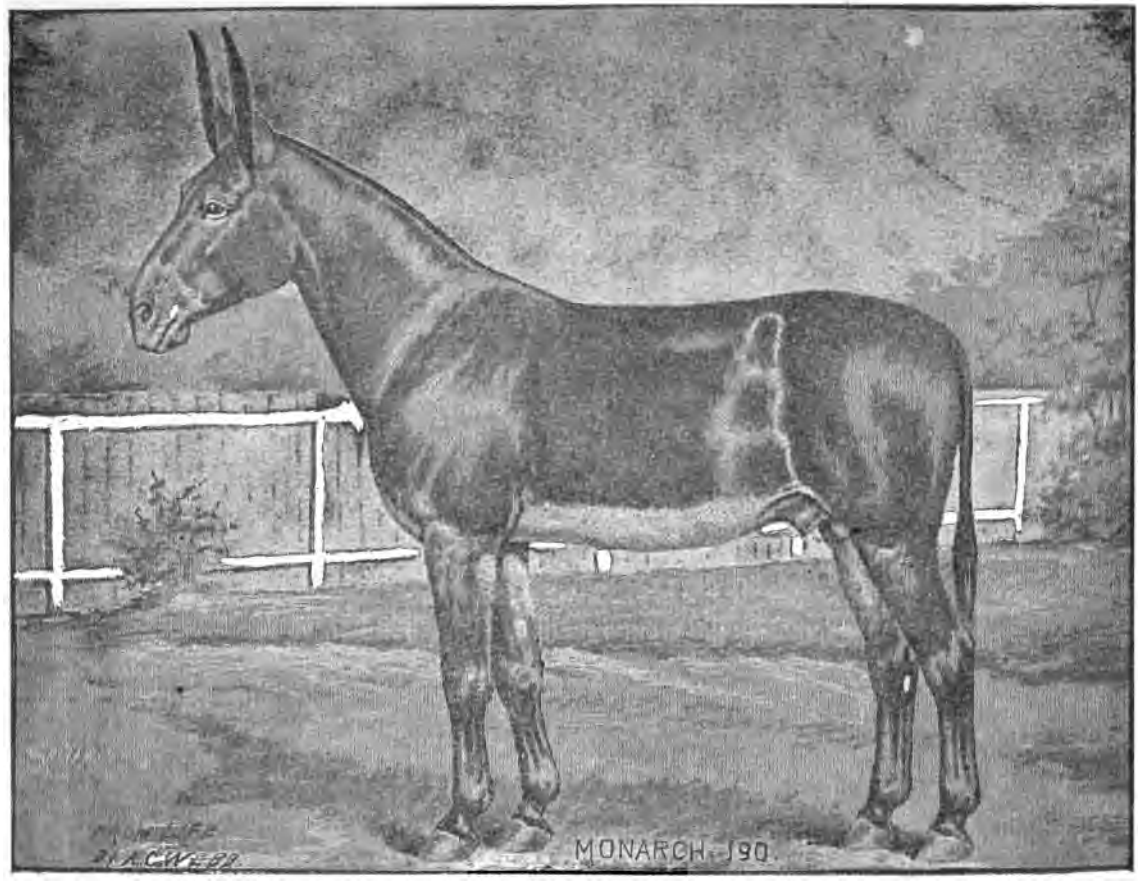
The Dairy Exhibit.—The World's Fair Commission made ample provision for a good dairy exhibit, and through its own officers, as well as through Mr. Levi Chubbuck, Secretary of the State Dairy Association, carried on an extensive correspondence with the dairy people of our State, agreeing to pay all charges on their product to and from the World's Fair, or to dispose of the product here and return proceeds to owners, as well as to bear all expenses incident to making the exhibit. But for some reason the dairy people of the State failed to take advantage of the opportunity, and the Commission was so discouraged that they attempted no dairy exhibit after June, because all of their efforts failed to procure more than about a dozen pails of butter for exhibition during that month, with no prospect of doing better during the three succeeding exhibits in July, September and October, as had been arranged by the World's Fair management. The cheese exhibit was even smaller than the butter exhibit, there being but one entry from the State.

The Fish Exhibit.—The Commission applied for space in the aquaria of the department of Fish and Fisheries, in which to make a live fish exhibit, but their request was refused upon the ground that the United States government would make an exhibition of all the live fishes known to the waters of the United States; hence it was unnecessary for the states to duplicate. Owing to this fact, we were compelled to content ourselves with making a stuffed fish exhibit, which embraced specimens of about all the species known to the waters of our State. The work was well done, and this exhibit will be of great permanent interest and value to the University of our State.

The Bird Exhibit.—Quite a nice collection of the birds of our State, prepared and mounted by Frank Dixon, taxidermist at Kansas City, were exhibited. This exhibit was installed as a feature of our agricultural exhibit, and contains a large number of species, many of which are rare and valuable. This collection will also be of great permanent value to the University of Missouri, where it is ultimately to go.

ARCHÆOLOGICAL EXHIBIT.

Last, but not least, is the Archæological, made in the Anthropological building by the State, under the auspices of the Missouri Historical Society. The collection exhibited belongs to this organization, and it is said to be the finest one west of Philadelphia.



JACK, MONARCH 190.

Property of Chas. Comstock, Albany, Gentry county, Mo., winner of first prize in two-year-old class at Chicago.

It consists of pre-historic relics principally, embracing the domestic utensils, the implements of war, and the paraphernalia employed in their religious rites. It was by great odds the largest and finest collection exhibited at the Fair of the kind, and attracted a great deal of attention. Indeed, it is said upon competent authority to be the finest exhibit of the kind ever shown at any World's Fair.

WAYS AND MEANS.

The work as above outlined was divided up as to its general supervision and responsibility among the members of the Board, by the organization of a series of committees, with a chairman for each. This not only tended to facilitate the work in hand, but also to locate responsibility. The several committees and their chairmen were as follows:

Chairman, Committee on Building and Site: Hon. Nathan Frank, St. Louis.

Chairman, Committee on Live Stock: N. H. Gentry, Sedalia, Missouri.

Chairman, Committee on Education: Dr. E. McD. Coffey, Platte City.

Chairman, Committee on Mines and Mining: H. H. Gregg, Joplin, until his resignation, then his successor, Frank Yale of Joplin.

Chairman, Committee on Horticulture: Charles W. Green, Brookfield.

PREMIUM AWARDS.

SADDLE HORSES.

(To be shown under saddle.)

Stallion 4 years old or over, Cartright & Ragsdale, Paris, ninth; T. S. Harrison, Auxvasse, sixth.

Stallion 4 years and under 5, J. A. Potts, Mexico, first; G. T. King, North Bloomington, second.

Stallion 3 years and under 4, E. L. Parish, St. Louis, first; H. F. Cabbell, Bosworth, third.

Mare 5 years or over, G. T. King, North Bloomington, second; G. T. King, North Bloomington, fourth.

Mare 4 years and under 5, J. A. Potts, Mexico, second.

Mare 3 years and under 4, T. S. Harrison, Auxvasse, first.

Gelding, J. A. Potts, Mexico, second; T. S. Harrison, Auxvasse, fifth.

Sweepstakes, stallion any age, A. F. Wychoff, Appleton City, first; Cartright & Ragsdale, Paris, eighth; T. S. Harrison, Auxvasse, fourth; J. A. Potts, Mexico, sixth.

Mare any age, G. T. King, North Bloomington, fourth; J. A. Potts, Mexico, second.

Collection, to consist of one stallion, one mare and one gelding, T. S. Harrison, Auxvasse, second; J. A. Potts, Mexico, second.

Special park and other fancy gaits, stallion, mare or gelding, any age, T. S. Harrison, Auxvasse, fourth; J. A. Potts, Mexico, sixth.

Special offered by Chief Buchanan for best saddle stallion, mare or gelding, T. S. Harrison, Auxvasse, third.

Special premium to gentleman displaying best horsemanship in saddle, Jeff. Bridgford, Paris, first.

JACKS AND JENNETS.

Jack 5 years or over, L. Monses, Smithton, first.

Jack 2 years and under 3, Chas. Comstock, Albany, first.

Jack, any age, Chas. G. Comstock, Albany, third; L. Monses, Smithton, fifth.

Memorandum: Entries in almost every class, but a great many marked "not shown in judges' books."

MULES.

Mules 4 years and under 5, Wallace Estill, Estill, second; Wallace Estill, Estill, first.

Pair of mules 4 years or over, Wallace Estill, Estill, first.

Below we give list of awards made to Hon. Wallace Estill, of Estill, Howard county, Mo. This is said to be the richest exhibit made at Chicago in the live-stock department.

ABERDEEN ANGUS.

Bull 3 years or over, Wallace Estill, Estill, first.

Bull 2 years and under 3, Wallace Estill, Estill, third.

Bull 1 year and under 2, Wallace Estill, Estill, second.

Bull 1 year and under, Wallace Estill, Estill, first.

Cow 3 years or over, Wallace Estill, Estill, first.

Heifer 2 years and under 3, Wallace Estill, Estill, third.

Heifer 1 year and under 2, Wallace Estill, Estill, second.

Heifer 1 year and under 2, Wallace Estill, Estill, third.

Heifer under 1 year, Wallace Estill, Estill, first.

Heifer under 1 year, Wallace Estill, Estill, second.

Herd, consisting of one bull, 2 years old or over, one cow 3 years old or over, one heifer 2 years old and under 3, one heifer 1 year old and under 2, one heifer 1 year old, Wallace Estill, Estill, first.

Young herd, consisting of one bull and four heifers, all under 2 years old, bred by exhibitor, Wallace Estill, Estill, first.

Four animals of either sex under 4 years, the get of one sire, Wallace Estill, Estill, first.

Two animals of either sex, product of one cow, Wallace Estill, Estill, first.

Two animals of either sex, product of one cow, Wallace Estill, Estill, second.

Bull any age, Wallace Estill, Estill, third,

Bull any age, Wallace Estill, Estill, fourth.

Cow any age, Wallace Estill, Estill, first.

Cow any age, Wallace Estill, Estill, second.

SWEEPSTAKES, ALL BEEF BREEDS.

Bull under 1 year, Wallace Estill, second.

Cow 3 years and over, Wallace Estill, first.

Heifer under 1 year, Wallace Estill, third and sixth.

Grand sweepstakes, Wallace Estill, sixth.

Young herd, Wallace Estill, fourth.

MULES.

Best mule 4 years and under 5, Wallace Estill, first.
Best mule 4 years and under 5, Wallace Estill, second.
Best pair mules 4 years, Wallace Estill, first.

SWEEPSTAKES.

Heifer, 1 year and under 2, B. O. Cowan, New Point, second.
Young herd, bull and 4 heifers, B. O. Cowan, New Point, third.

SHORT-HORNS.

Bull 3 years or over, T. S. Ragsdale, Paris, seventh.
Bull 2 and under 3 years, B. O. Cowan, New Point, fifth.
Bull 1 and under 2 years, B. O. Cowan, New Point, eleventh.
Cow 3 years or over, T. W. Ragsdale, Paris, twenty-third, T. W. Ragsdale, Paris, eighteenth.
Heifer 2 years and under 3, T. W. Ragsdale, Paris, seventeenth, T. W. Ragsdale, Paris, tenth.
Heifer 1 year and under 2, B. O. Cowan, New Point, first, B. O. Cowan, New Point, sixth.
Heifer under 1 year, T. W. Ragsdale, Paris, thirteenth, B. O. Cowan, New Point, Ninth.
Young herd consisting of bull and four cows, all under two years, B. O. Cowan, New Point, second.
Sweepstakes, bull any age, T. W. Ragsdale, Paris, sixth.
Sweepstakes, cow any age, T. W. Ragsdale, Paris, ninth, T. W. Ragsdale, Paris, eighth, B. O. Cowan, New Point, second.

SWEEPSTAKES—HEREFORDS.

Bull 3 years or over—Gudgell & Simpson, Independence, second.
Bull 2 years and under 3—Gudgell & Simpson, Independence, fifth.
Bull 1 year and under 2—Gudgell & Simpson, Independence, first.
Cow 3 years or over—Gudgell & Simpson, Independence, sixth.
Heifer 2 years and under 3—Gudgell & Simpson, Independence, fifth.
Heifer 1 year and under 2—Gudgell & Simpson, Independence, eleventh; Gudgell & Simpson, Independence, seventh.
Heifer under 1 year—Gudgell & Simpson, Independence, first.
Herd, consisting of 1 bull 2 years or over and 1 cow of each age—Gudgell & Simpson, Independence, third.
Young herd, consisting of 1 bull and 4 heifers, all under 2 years—Gudgell & Simpson, Independence, first.
Four animals of either sex under 4 years, the get of one sire—Gudgell & Simpson, Independence, second.
Sweepstakes, bull any age—Gudgell & Simpson, Independence, second; Gudgell & Simpson, Independence, fourth.

SWEEPSTAKES.

By ages, open to beef breeds that were first and second winners in their classes:

Bull 3 years or over—Gudgell & Simpson, Independence, fourth.

Bull 1 year and under 2—Gudgell & Simpson, Independence, fourth.

Heifer under 1 year—Gudgell & Simpson, Independence, fourth.

Young herd, bull and 4 heifers—Gudgell & Simpson, Independence, fifth.

RED POLLED.

Bull 3 years or over—J. S. and L. K. Haseltine, Dorchester, fourth.

Bull 1 year and under 2—J. S. and L. K. Haseltine, Dorchester, fifth.

Bull 1 year and under 2—J. S. and L. K. Haseltine, Dorchester, third.

Bull under 1 year—J. S. and L. K. Haseltine, Dorchester, eighth.

Bull under 1 year—J. S. and L. K. Haseltine, Dorchester, fourth.

Cow 4 years or over, J. S. and L. K. Haseltine, Dorchester, fourth.

Cow 3 years and under 4, J. S. and L. K. Haseltine, Dorchester, fifth.

Heifer 2 years and under 3, J. S. and L. K. Haseltine, Dorchester, fourth.

Heifer 1 year and under 2, J. S. and L. K. Haseltine, Dorchester, eighth.

Heifer 1 year and under 2, J. S. and L. K. Haseltine, Dorchester, seventh.

Heifer under 1 year, J. S. and L. K. Haseltine, Dorchester, seventh.

Heifer under 1 year, J. S. and L. K. Haseltine, Dorchester, sixth.

Herd, consisting of one bull 2 years or over, one cow 3 years old or over, one heifer 2 years old and under 3, one heifer 1 year old and under 2, one heifer under 1 year old, J. S. and L. K. Haseltine, Dorchester, fifth.

Young herd, consisting of one bull and four heifers, all under 2 years, bred by exhibitor, J. S. and L. K. Haseltine, Dorchester, fifth and sixth.

Four animals, get of one sire, J. S. and L. K. Haseltine, Dochester, sixth and seventh.

Two animals of either sex, the product of one cow, J. S. and L. K. Haseltine, Dorchester, sixth.

SWEEPSTAKES.

Sweepstakes, herd consisting of bull 2 years or over and four cows, one of each age, J. S. and L. K. Haseltine, Dorchester, ninth.

JERSEYS.

Bull 3 years old or over, Rolla Oliver, Dearborn, eleventh.

Bull 2 years and under 3, George H. Shawhan, Lone Jack, fourth.

Bull 1 year and under 2, George H. Shawhan, Lone Jack, fourth.

Bull under 1 year, Rolla Oliver, Dearborn, ninth.

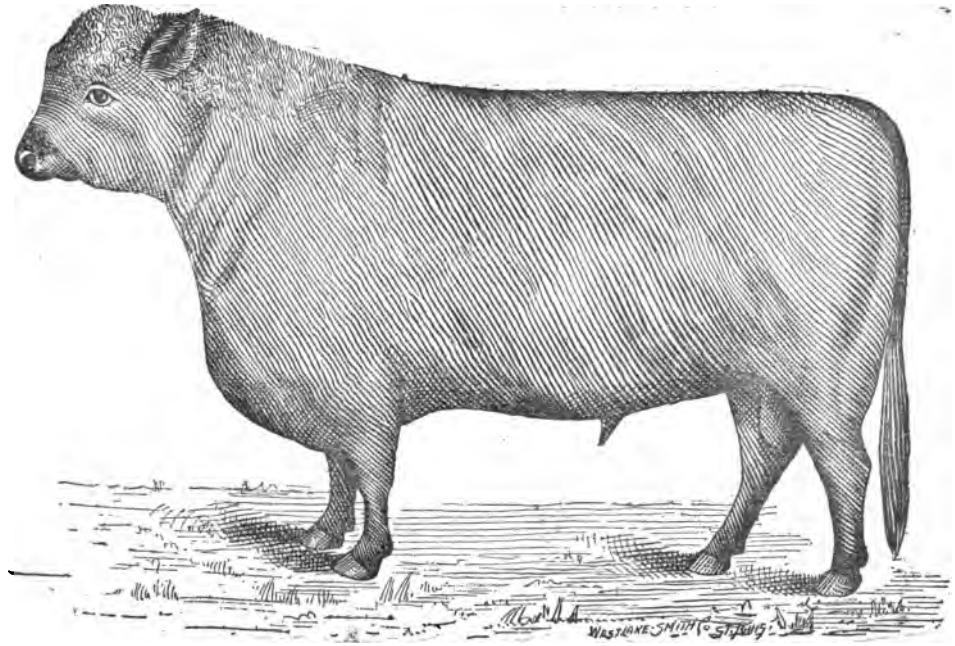
Cow 4 years or over, Rolla Oliver, Dearborn, twenty-sixth; O. and C. T. Graves, Maitland, thirteenth; Geo. H. Shawhan, Lone Jack, thirtieth.

Cow 4 years or over, Geo. H. Shawhan, Lone Jack, third; Rolla Oliver, Dearborn, eighth; Rolla Oliver, Dearborn, eleventh.

Heifer 2 years and under 3, Geo. H. Shawhan, Lone Jack, third; Rolla Oliver, Dearborn, fourteenth.

Heifer 1 year and under 2, Geo. H. Shawhan, Lone Jack, third and eighteenth; Rolla Oliver, Dearborn, fourteenth; Rolla Oliver, Dearborn, fifteenth.

Heifer under 1 year, Geo. H. Shawhan, Lone Jack, seventh; Rolla Oliver, Dearborn, fourteenth; Rolla Oliver, Dearborn, tenth.



JUMBO, 1894.

Red Polled bull, property of Ira S and L. K Haseltine, Dorchester, Greene county, Mo. Weighed 1700 pounds at two years old, now weighs 2200 pounds. Won first at Topeka, Kansas City, Springfield and St. Louis, and sweepstakes over all breeds at Springfield in 1890 and at Columbian Exposition in Chicago in 1893.

Herd consisting of one bull 2 years or over, one cow 4 years or over, one cow 3 years old and under 4, one heifer 2 years old and under 3, one heifer 1 year old and under 2, one heifer under 1, Geo. H. Shawhan, Lone Jack, fourth; Rolla Oliver, Dearborn, seventh.

Young herd consisting of one bull and four heifers, all under 2 years old, bred by exhibitor, Geo. H. Shawhan, Lone Jack, fifth; Rolla Oliver, Dearborn, ninth.

Four animals of either sex, the get of one sire, Geo. H. Shawhan, Lone Jack, seventh.

Two animals of either sex, the product of one cow, Geo. H. Shawhan, Lone Jack, seventh; Rolla Oliver, Dearbon, twelfth; Rolla Oliver, Dearborn, thirteenth.

Heifer under 1 year, Geo. H. Shawhan, Lone Jack, seventh.

SWINE—BERKSHIRE.

Boar 2 years or over, N. H. Gentry, Sedalia, second.

Boar 1 year and under 2, N. H. Gentry, Sedalia, third and fifth.

Boar 6 months and under 1 year, N. H. Gentry, Sedalia, first and second.

Boar under 6 months, N. H. Gentry, Sedalia, eighth and tenth.

Sow 2 years or over, N. H. Gentry, Sedalia, first and fourth.

Sow 1 year and under 2, N. H. Gentry, Sedalia, first and fifth.

Sow 6 months and under 1 year, N. H. Gentry, Sedalia, first and fifth.

Sow under 6 months, N. H. Gentry, Sedalia, seventh and twelfth.

Boar and three sows under 1 year, N. H. Gentry, Sedalia, second and fourth.

Boar and three sows bred by exhibitor, N. H. Gentry, Sedalia, first and third.

Boar and three sows under 1 year, first, seventh and fourth.

Four swine, get of the same boar, bred by exhibitor, N. H. Gentry, Sedalia, first and second.

Four swine, get of the same boar, bred by exhibitor, N. H. Gentry, Sedalia, first and second.

Four pigs under 6 months, product of same sow, N. H. Gentry, Sedalia, fourth.

SWINE—BERKSHIRE SWEEPSTAKES.

Boar any age, N. H. Gentry, Sedalia, second, fourth and first.

Boar any age, bred by exhibitor, N. H. Gentry, Sedalia, first and second.

Sow of any age, bred by exhibitor, N. H. Gentry, Sedalia, first and second.

SWINE—BERKSHIRE.

Boar 2 years or over, F. A. Scott, Huntsville, fourth.

Boar 1 year and under 2, F. A. Scott, Huntsville, seventh.

Boar 6 months and under 1 year, F. A. Scott, Huntsville, sixth and eighth.

Sow 6 months and under 1 year, F. A. Scott, Huntsville, eleventh and twelfth.

Boar and three sows under 1 year, F. A. Scott, Huntsville, sixth.

Boar and three sows, bred by exhibitor, F. A. Scott, Huntsville, seventh.

Four swine, get of same boar, bred by exhibitor, F. A. Scott, Huntsville, ninth.

SWINE—POLAND-CHINA.

Boar 1 year and under 2, Monsee & Wiley, Smithton, ninth.

Boar 6 months and under 1 year, Monsee & Wiley, Smithton, twenty-fourth.

Boar under 6 months, Monsee & Wiley, Smithton, tenth and fifteenth.

Sow, 2 years or over, Monsee & Wiley, twenty-fourth.

Sow 1 year and under 2, Monsee & Wiley, Smithton, twelfth.

Sow 6 months and under 1 year, Monsee & Wiley, Smithton, fifteenth.

Sow under 6 months, Monsee & Wiley, Smithton, sixteenth and twentieth.

Boar and three sows under 1 year, Monsee & Wiley, Smithton, eleventh and twelfth.

Four swine, get of same boar, Monsee & Wiley, Smithton, fourteenth.

Four pigs under 6 months, product of same sow, Monsee & Wiley, Smithton, tenth.

Four pigs under 6 months, product of same sow, Monsee & Wiley, Smithton, eleventh.

SWINE—POLAND-CHINA.

Boar 2 years or over, Brown & Luce, Shelbina, nineteenth.

Boar 6 months and under 1 year, Brown & Luce, Shelbina, twentieth.

Boar under 6 months, Brown & Luce, Shelbina, sixteenth.

Sow 2 or years over, Brown & Luce, Shelbina, tenth and twenty-first.

Sow 6 months and under 1 year, Brown & Luce, Shelbina, sixteenth and eighteenth.

Sow 6 months, Brown & Luce, Shelbina, fifteenth.

Sow under 6 months, Brown & Luce, Shelbina, seventeenth.

Boar and three sows over 1 year, Brown & Luce, Shelbina, twelfth.

Boar and three sows under 1 year, Brown & Luce, Shelbina, eleventh and ninth.

Four swine, the get of same boar, Brown & Luce, Shelbina, thirteenth.

Four pigs under 6 months, product of same sow, Brown & Luce, Shelbina, fifth.

SWINE—POLAND-CHINA.

Boar 2 years or over, Risk & Gabbett, Weston, sixteenth.

Boar 1 year and under 2, Risk & Gabbett, Weston, twelfth.

Sow 2 years or over, Risk & Gabbett, Weston, twenty-second.

Sow 1 year and under 2, Risk & Gabbett, Weston, tenth.

Boar and three sows over 1 year, Risk & Gabbett, Weston, ninth.

Boar and three sows, bred by exhibitor, Risk & Gabbett, Weston, fourth.

Four swine, the get of same boar, Risk & Gabbett, Weston, twelfth.

SWINE—POLAND-CHINA.

Boar 2 years or over, Geo. W. Falk, Richmond, eleventh.

Boar 1 year and under 2, Geo. W. Falk, Richmond, eleventh.

Boar 6 months and under 1 year, Geo. W. Falk, Richmond, fifteenth.

Boar under 6 months, Geo. W. Falk, Richmond, eleventh.

Sow 2 years or over, Geo. W. Falk, Richmond, twenty-third.

Sow 1 year and under 2, Geo. W. Falk, Richmond, eleventh.

Sow 6 months and under 1 year, Geo. W. Falk, Richmond, tenth and seventeenth.

Sow under 6 months, Geo. W. Falk, Richmond, eighteenth.

Boar and three sows over 1 year, George W. Falk, Richmond, tenth.

Boar and three sows, bred by exhibitor, George W. Falk, Richmond, fifth.

Boar and three sows under 1 year, George W. Falk, Richmond, ninth and eighth.

Four swine, the get of the same boar, bred by exhibitor, George W. Falk, Richmond, tenth.

SWINE—POLAND-CHINA.

Boar 2 years or over, Robt. T. Young, St. Joseph, thirteenth and fourteenth.

Boar 1 year and under 2, Robt. T. Young, St. Joseph, seventeenth.

Boar 6 months and under 1 year, Robt. T. Young, St. Joseph, eleventh and twenty-third.

Sow two years or over, Robt. T. Young, St. Joseph, sixteenth and eighteenth.

Sow 6 months and under 1 year, Robt. T. Young, St. Joseph, eleventh and twelfth.

Sow under 6 months, Robt. T. Young, St. Joseph, nineteenth.

Boar and three sows under 1 year, Robt. T. Young, St. Joseph, fifteenth and thirteenth.

Boar and three sows under 1 year, bred by exhibitor, Robt. T. Young, St. Joseph, eleventh.

Four swine, the get of the same boar, Robt. T. Young, St. Joseph, eleventh.

SHEEP—SOUTHDOWN.

Ram under 1 year, F. A. Scott, Huntsville, eleventh and sixth.

Ewe 1 year and under 2, F. A. Scott, Huntsville, fourteenth and fifteenth.

Ewe under 1 year, F. A. Scott, Huntsville, twelfth and thirteenth.

Pen of two rams and three ewes under 2 years, bred by exhibitor, F. A. Scott, Huntsville, seventh.

MERINO—HEAD, "A."

Ram 2 years and under 3, L. E. Shattuck, Stanberry, third.

Ram 1 year and under 2, L. E. Shattuck, Stanberry, seventh and eleventh.

Ram under 1 year, L. E. Shattuck, Stanberry, tenth and first.

Ewe 3 years or over, L. E. Shattuck, Stanberry, eighth and fourth.

Ewe 2 years and under 3, L. E. Shattuck, Stanberry, fourth and seventh.

Ewe 1 year and under 2, L. E. Shattuck, Stanberry, twenty-ninth and twenty-eighth.

Ewe under 1 year, L. E. Shattuck, Stanberry, fourth and ninth.

Ram and three ewes all over 3 years, L. E. Shattuck, Stanberry, fifth.

SWEEPSTAKES.

Ram any age, L. E. Shattuck, Stanberry, fifth.

Ewe any age, L. E. Shattuck, Stanberry, fifth.

MERINO—"B."

Ram 3 years or over, L. E. Shattuck, Stanberry, first and fourth.

Ram 2 years and under 3, L. E. Shattuck, Stanberry, seventh.

Ram 1 year and under 2, D. Baker & Co., Stanberry, second and eighth; L. E. Shattuck, Stanberry, seventh and fourth.

Ram under 1 year, L. E. Shattuck, Stanberry, second and third.

Ewe 3 years or over, D. Baker & Co., Stanberry, second; L. E. Shattuck, Stanberry, first and fourth.

Ewe 2 years and under 3, L. E. Shattuck, Stanberry, first.

Ewe 1 year and under 3, D. Baker & Co., Stanberry, eighth and ninth.

Ewe 1 year and under 2, L. E. Shattuck, Stanberry, third, first, fifth and fourth.

Ram and three ewes all under 2 years, L. E. Shattuck, Stanberry, first.

Pen of five ewes, 2 years or over, bred by exhibitor, L. E. Shattuck, Stanberry, first.

Pen of two rams and three ewes, under 2 years, bred by exhibitor, L. E. Shattuck, Stanberry, first.

SWEEPSTAKES.

Ram any age, L. E. Shattuck, Stanberry, first.

Ewe any age, L. E. Shattuck, Stanberry, first and second; D. Baker & Co., Stanberry, fourth.

DELAINE MERINO.

Ram 2 years and under 3, L. E. Shattuck, Stanberry, first.

Ram 1 year and under 2, L. E. Shattuck, Stanberry, first; D. Baker & Co., Stanberry, fifth.

Ram under 1 year, L. E. Shattuck, Stanberry, second.

Ewe 3 years or over, L. E. Shattuck, Stanberry, third and fourth; D. Baker & Co., Stanberry, eighth; L. E. Shattuck, Stanberry, fifth.

Ewe 2 years and under 3, D. Baker & Co., Stanberry, fifth and fourth; L. E. Shattuck, Stanberry, first and second.

Ewe 1 year and under 2, L. E. Shattuck, Stanberry, first and third; D. Baker & Co., Stanberry, seventh.

Ewe under 1 year, D. Baker & Co., Stanberry, sixth; L. E. Shattuck, Stanberry, first and fourth.

Ram and three ewes, all over 2 years, L. E. Shattuck, Stanberry, second.

Pen of two rams and three ewes, under 2 years, bred by exhibitor, L. E. Shattuck, Stanberry, second.

SWEEPSTAKES.

Ram any age, L. E. Shattuck, Stanberry, fourth and second.

Ewe any age, L. E. Shattuck, Stanberry, fifth and fourth.

AWARD IN WOOLS—GROUP IX.

L. E. Shattuck, Stanberry, first.

G. B. Bothwell, Breckinridge, second.

POULTRY.

J. R. Lampson, Mexico, Mo., Barred Plymouth Rock cockerel, second.

J. E. Rundell, Lamar, Barred Plymouth Rocks, third.

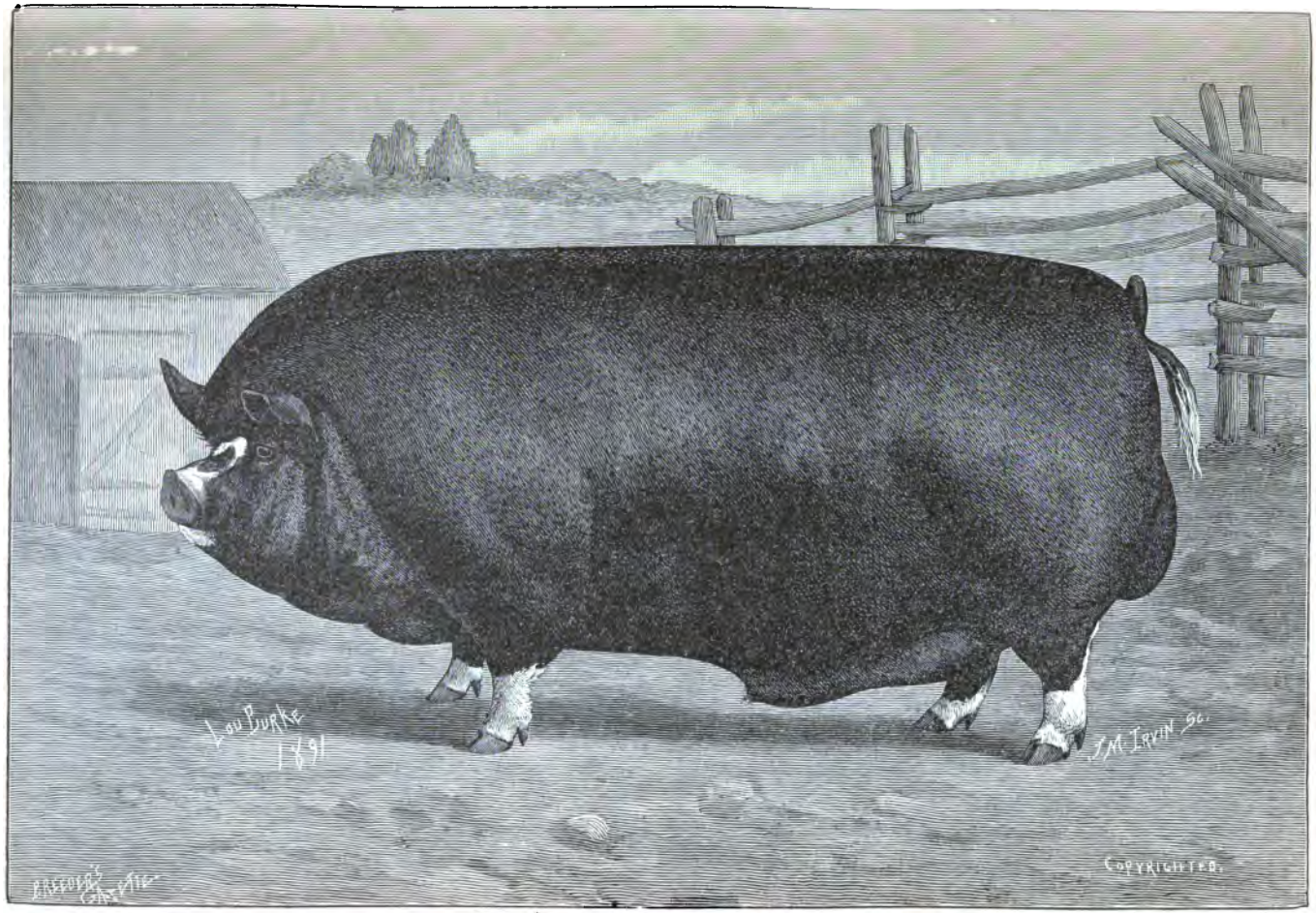
J. R. Lampson, Mexico, Barred Plymouth Rock hen, first.

James Qurolla, Kearney, award for: Single comb, Brown Leghorn hen, fourth; single comb, Brown Leghorn cockerel, second; single comb, Brown Leghorn pullet, first.

Mrs. Thos. W. Ragsdale, Paris, award for: Bronze Turkey, Tom, third; Bronze Turkey hen, second.

A. L. Lowe, St. Louis, award for Pigeons: White Trumpeter hen, first; White Trumpeter cockerel, first; Black Trumpeter cockerel, first.

R. A. Quarles, St. Louis, award for Pigeons: Jacobin, any other color, cockerel, first; Yellow Fan Tail cockerel, first; Yellow Fan Tail hen, first.



KING LEE 27500.

Property of N. H. Gentry, Sedalia, Mo. Weighed at ten months, 420 lbs; at two years, 720 lbs. Winner of sweepstakes for best Berkshire boar of any age, at the great St. Louis and Illinois State fairs, 1892, and at the World's Fair, in Chicago, 1893. He is sire to the show sow Duchess, winner of sweepstakes for best Berkshire sow bred by an exhibitor, also best Berkshire sow of any age. Her total winnings in cash amount to over $500.

DEPARTMENT AGRICULTURE—GROUP I.

Hiram Howard, Marshall, award on corn.
Geo. W. Steele, New Madrid, award on corn.
James Pope, Platte City, award on corn.
C. W. Bolster, Princeton, award on corn.
Robert A. Dawson, New Madrid, award on corn.
Missouri Agricultural College, Columbia, award on wheat.
Lorenz Geiger, St. Louis, award on rye.
Mrs. M. J. Hern, Carsonville, award on rye.
Lorenz Geiger, Carsonville, award on rye.
L. M. Dean, Gordonville, award on millet.
Fred. Sessinghaus, Carsonville, award on millet.
Jacob Walschlager, Georgetown, award on orchard grass.
William Bouche, St. Louis, model horse in grain.
Mr. Bennett, Dunklin county, award on peanuts.
Mr. Bennett, Dunklin county, award on cotton seed.
Missouri Agricultural College, Columbia, award on Climax tobacco.
J. K. Gwynn, St. Louis, Group XIV, exhibit best and most varied.
William Bouche, St. Louis, pavilion, artistic design.

FRUIT.

State of Missouri, Westport, award for stone fruits.
S. W. Gilbert, Thayer, award for stone fruits.
Olden Fruit Company, Olden, award for stone fruits.
State Horticultural Society, Westport, award for apples, 1892 and 1893.
Olden Fruit Company, Olden, award for apples, pears and crabs.
S. W. Gilbert, Thayer, award for apples and pears.
N. F. Murray, Oregon, award for apples and pears.
George A. Ditz, Olden, award for evaporated prunes.
George A. Ditz, Olden, award for evaporated peaches unpeeled.
George A. Ditz, Olden, award for fruit evaporator.
Oregon Canning Company, Oregon, award for tomatoes and corn in tin cans.
Wirt & Knox Manufacturing Company, Independence, award for—
State of Misosuri, Westport, award for vegetables and solution.

HORTICULTURE.

Herbarium, collection of plants. Collection of fine palms and other plants.

FORESTRY.

Award for a well-arranged and instructive display of tree sections, showing a large variety of indigenous growths of timber, notable for size, soundness and freedom from blemishes.

Award for the excellent selection and display of thirty large discs, showing the capabilities of the respective varieties for economical and ornamental purposes.

Award for the display of 126 plain and varnished panels of the State suitable for economic use, thereby intelligibly showing the capabilities of the respective varieties for economic and ornamental purposes.

Award for the remarkably fine specimens of rived white oak, stave and heading bolt timber, exhibited in large sizes of 5×12×22, thereby showing the possibilities for development in timber of this variety and quality.

MISSOURI MINERAL EXHIBITS AT THE EXPOSITION.

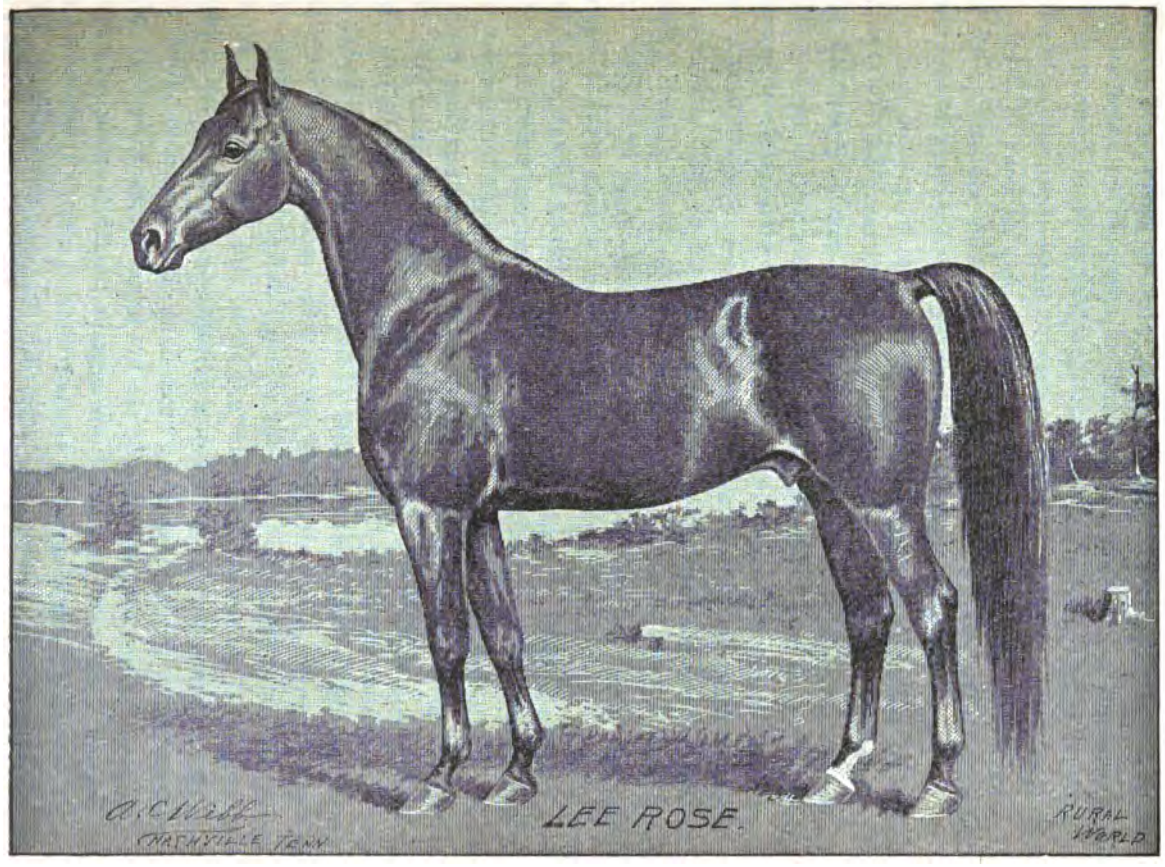
BY E. O. HOVEY, PH. D., SUPERINTENDENT OF THE EXHIBIT.

(*Reprinted from "Mines and Mining."*)

Missouri produces about as much zinc ore as all the rest of the United States put together; stands second in the Union in the production of lead; mines very large quantities of coal and considerable iron ore; and has valuable deposits of clay and quarries of various building stones and marbles, besides other sources of mineral wealth. In recognition of her prominence as a mining state and on account of her extensive and intelligent preparations for making a creditable display, she was assigned a position of honor in the middle of the mining building, at the southeast corner formed by the intersection of the two main central isles. The exterior installation was itself in the nature of an exhibit. It consisted of a colonnade in Italian Renaissance style of handsome light brown terra cotta pilasters, furnished by the Winkle Terra Cotta Company of St. Louis, resting on a low screen wall of Roman brick from the yards of Evans & Howard, St. Louis, and surmounted by a wooden cornice. The base of the whole structure was of fine red granite from the quarries of the Syenite Granite Company, at Graniteville. The main entrance to the exhibit was at the central corner, and its sides were ornamented with panels of onyx from Stone and Texas counties.

On account of the pre-eminence of the State in zinc and lead ores, special emphasis was laid on them in the collection and arrangement of the exhibit. The zinc region of the State is concentrated in Jasper, Newton and Lawrence counties — more than 97 per cent of the ore mined in the State coming from the three counties, and 79 per cent coming from Jasper county alone. Seven other counties produce zinc ore in commercial quantities. The production of the State by counties for 1892 is given in the following tables: Dade, 103 tons (of 2000 lbs), Barry 192, Greene 899, Jefferson 2075, Newton 8343, Lawrence 13,861, Jasper 106,014; total, 131,487 tons. In past years zinc ore has been mined in Washington, Wright, Christian, Howell, Webster and Morgan counties also, and is known to occur in small quantities in many other parts of the State.

The chief ore is the sulphide or sulphurite, locally known among the miners as jacks, and called rosin jack, black jack or steel jack, according to its color. The other Missouri zinc ores are calamine, the



LEE ROSE, No. 882.

Property of J. A. Potts, Mexico, Mo. He was first exhibited at Louisiana, Mo., for the $200 saddle stallion stake, and won first prize. He was next shown at Chicago, where he was crowned king of the world's four-year old saddle horses.

hydrous orthosilicate and smithsonite, the carbonate, which are indiscriminately called "silicate" by the miners. Sphalerite is the principal ore of the Joplin district, and is the most valuable of the three, containing 67 per cent of zinc. Aurora and Granby produce the most of the calamine and smithsonite. These ores contain 54 per cent and 52 per cent metallic zinc respectively. Smithsonite is relatively of less importance in the State than calamine. A large part of the calamine from Aurora is used in the manufacture of zinc white at Waukegan, Ill. Most of the ore is smelted outside the State, only about 28,750,000 pounds of spelter being produced in Missouri in 1892.

Zinc occurs in most of the paleozoic geologic formations of Missouri, but the great deposits are confined to the lower carboniferous, or Mississippi strata, and are there found, "sometimes in thin sheets in crevices in the massive limestone; sometimes in great chambers; sometimes buried in clay and a mass of loose material which can be excavated by pick; sometimes disseminated through solid, brecciated rock which has to be blasted down; sometimes lining cavities with drusy crystals." (Winslow.) Statistics of the production in past years are very hard to get and are not always accurate, but those obtainable show a fairly steady increase of output from 1870, when zinc mining began in Jasper county, and the output was 4000 tons to 1889. Since the latter date the increase has been very rapid, and there is no reason to believe that the maximum rate of production has yet been reached. Crude and wasteful methods of mining and concentrating have been the rule rather than the exception in Southwest Missouri, and there is still room for great improvement, though modern machinery and methods have been introduced by many of the larger companies in the last two or three years. Few of the miners really know what their ore has cost them as it lies in the bin, but one of the companies that keeps books, scientifically, has given the following figures as to the average cost of mining and concentrating at one of its mines in 1892: Mining (including culling and all dead work), 75c. per ton, hoisted; hoisting, 23c.; pumping, 26c.; haulage of ore to mill, 11c. per ton taken to mill; general expense and fixed charges 26c.; concentration, 50c. Regarding these figures it should be said that the water is unusually heavy at this mine, and that the company did more prospecting in 1892 than usual, and therefore did not run the mill to its full capacity all the time.

The principal feature of the zinc exhibit was the finely crystallized specimens from Carterville, chief among these being those from the North Star mine on the Perry land. Resting on a table at one side of the main entrance was a mass of almost pure "rosin jack" from this mine, weighing 1650 lbs. Many other specimens from this and other

mines in the district were notable for their perfection or complexity of crystalline form. The variety in sphalerite was astonishing to those not familiar with the mineral. An interesting feature of some of the North Star specimens was the numerous tetrahedra of chalcopyrite on the surface of some of the crystals of sphalerite. The tetrahedra were small, not exceeding 2 mm. in an edge, and all those on a given surface were in a parallel position. Specimens from the Victor mine show a similar phenomenon, but the tetrahedra are much larger, measuring 8 to 10 mm. on an edge. Occupying a place of honor on a pedestal of zinc on a table in the center of the space was a magnificent specimen of black sphalerite, weighing 790 lbs., from the Eagle mines of the Empire Zinc Company at Joplin. This was made of huge aggregate crystals, 4 to 6 in. (10 to 5 cm.) in diameter, which were dotted over with small doubly terminated scalenohedra of calcite as if with rice, while here and there a small octahedron of galenite could be seen.

A very instructive feature of the sphalerite exhibit was a display of the work done by the Empire Zinc Company, in concentrating the ore from the Kohinoor mine. Twenty-one jars, neatly arranged in a handsome open case, showed the work of one day. The books of the company indicate that the day did not happen to be a good one for ideal results. The jars were arranged so as to show the rock as it came from the crusher, and as it was fed to each of four sizes of jigs and to each of the two sizes of slime tables, and the "heads" or concentrates and "tailings" or refuse from each. The percentage of zinc in the concentrate was given in each case; for the slime table this was about 54 per cent, and for the jigs was from 63 per cent to 65 per cent. The amount of zinc in the "general sample" was about 64 per cent, while that in the tailings therefrom was about 2 per cent, and that in the rock crushed was about 18½ per cent. This company also furnished the spelter used in building a column containing 200 slabs, and weighing 9600 pounds, which represented the amount of metal in the zinc ore mined in the State every fifteen minutes of working time in 1892.

Lead is mined in Missouri as a sulphide, galenite (87% Pb.), and as a carbonate, cerussite (78% Pb.), incorrectly called "drybone" by the miners. The latter is the direct product of the decomposition of the former, and is found near the surface. Galenite is the more valuable and also the more common ore. Lead is known to occur widely throughout the State, and has been mined in 26 counties. In 1892 the production of pig lead by counties was, in tons of 2000 pounds: Perry, 4; St. Francois, 15,430; Washington, 1166; Miller, 16; Greene, 264; Lawrence, 3719; Newton, 812; Madison, 2865; Jefferson, 268; Franklin,

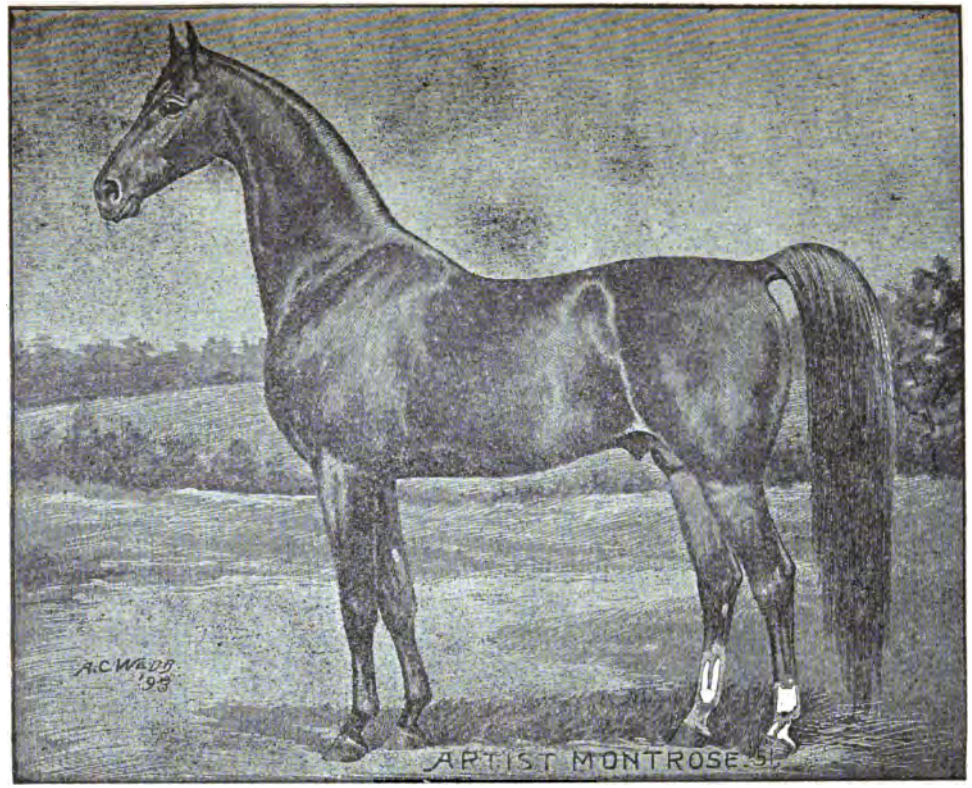
98; Cole, 23; Barry, 55; Dade, 64; Jasper, 7476; total production pig lead in 1892, 32,260 tons.

Lead was the first metal mined in the State, mention of its production being made as early as 1700. The Mine La Motte diggings, in Madison county, were opened in 1723, and have been worked intermittingly ever since. Lead mining in the southwestern district dates from about 1850. The lead ores of the southwestern counties are very closely associated with the zinc ores, and therefore occur in the Mississippian formation. They are in a more or less concentrated state and are readily cleaned by hand picking or jigging. Large isolated crystals and groups of crystals are not uncommon. The finest specimens of crystals of galenite in the exhibit were from the land of the Oswego Mining Company, Joplin. Of these the largest group measured more than two feet in length, and contained many almost perfect cubes, some of which were fully three inches on the edge. The galenite of the southeastern region, on the other hand, is disseminated in small crystals or crystalline masses through solid limestome (of Cambrian age), and is so intimately mixed with the rock that an elaborate plant is needed for its proper concentration. Such a plant was illustrated in the exhibit of a beautiful model (1-32 actual size) of the ore-dressing works at Bonne Terre, St. Francois county, owned and operated by the St. Joseph Lead Company. This mill handles from 900 to 1000 tons of rock every 24 hours. (Each crusher feeds its own set of roughing jigs, sand jigs and percussion slime tables, so that in case of a breakdown it is not necessary to stop the whole mill, but only that series in which the accident occurs. All the crushers, jigs and slime tables are on the main floor of the mill, while the rolls, screens, classifiers, settling vats and rotary pumps for the elevation of the material for the jigs and slime tables are on the floor beneath, and everything is arranged to work as automatically and with as little manual labor as possible.) In addition to this model, the exhibit of this company consisted of a series of specimens and samples, showing very fully the country rock and the occurrence of the ore in it, the milling products and the various stages of furnace work to commercial lead. Besides these is a set of large photographs of the mills, furnaces, etc., belonging to the company. This company's mines at Bonne Terre are the largest lead mines in North and South America, and the third largest in the world. Their annual product is upward of 14,000 tons of pig lead. A pile of 70 pigs, or 5600 pounds, of lead furnished by the same company, represented the amount of lead in the ore raised in the whole State every fifteen minutes of working time in 1892.

The Picher Lead Company, of Joplin, made a unique display of a comparatively new industry—the manufacture of strictly amorphous lead sulphate for paint. This is made directly from galenite by the Lewis-Bartlett process, as a by-product in the smelting of pig-lead. The process consists in catching in tow bags the volatilized lead sulphide given off by the open Scottish hearth furnaces; burning the sublimed sulphide in the open air; completing the oxidation to sulphate in a furnace, and purifying the sublimed product. The exhibit consisted of crude ore and slag and grades "A" and "AA" of "sublimed white lead," which contains small percentages of PbO, and "sublimed lead sulphate," which is more than 99 per cent pure PbSO4. The firm marketed more than 5000 tons of this product in 1892.

Nearly in the center of the exhibition space stood a pyramid ten feet high, made up of huge masses of lead and zinc ores aggregating 28,000 pounds, representing the output of concentrated ore of the whole State for fourteen minutes of working time in 1892. The most striking specimens in the pile was a mass of pure galenite from Belleville, Jasper county, weighing 6500 pounds, another from Webb City, weighing 2400 pounds, and one of rich disseminated galenite in limestone from Bonne Terre, weighing more than 5000 pounds. The largest masses of zinc ore in the pyramid weighed from 500 to 700 pounds.

The chief mineral associate of the lead and zinc ores of Missouri is calcite, and this was displayed in the exhibit in wonderful variety, beauty and complexity of form. The largest single crystal was a double-terminated acute scalenohedron from Joplin, more than two feet in length. Numerous specimens from "Crystal cave," Joplin, were large, perfect scalenohedra of pale yellow and amethystine color. Many contain needles of marcasite arranged so as to outline a "phantom" within the crystal. The series of calcite crystals and groups from one of the old copper mines near Ste. Genevieve, exhibited by Mr. George S. Knapp, of Chicago, were remarkable for perfection of form and for showing two and three stages of growth in parallel positions. Other important associates of the lead and zinc are dolomite, marcasite, or "white iron pyrites," and barite, all of which were represented in the exhibit. Much of the sphalerite of Jasper county is coated with a thin layer of CdS or greenockite. About seventy-five minerals in all have been reported as occurring in the State. A display of especial interest to mineralogists was that of millerite and associated calcite, aragonite, selenite, fluorite and barite from cavities in the lower carboniferous limestone of St. Louis city, loaned by Profs. W. B. Potter and H. A. Wheeler of St. Louis.



ARTIST MONTROSE 51.

Saddl e stallion. Property of C. F. Wycoff, Appleton City, Mo. Sire: Artist 75 by King William 67. First dam by Montrose 106, by Gay's Denmark 68. Second dam by Bald Stockings. Third dam by Highlander. Winner of first premium in St. Louis in 1888; also of sweepstake medal at the Columbian Exposition, Chicago, September 6, 1893.

Missouri has been a very prominent and important producer of iron ore, but the production culminated in 1887, and has suffered sharp decline since, owing to exhaustion of old mines, low price of iron, and the competition of the better situated Michigan mines. In 1880 she ranked sixth in the Union in the production of iron ore, but in 1891 she had dropped to thirteenth place, and is now even lower. Iron ores are widely distributed throughout the State, and occur in different forms in most of the geological formations. Mining, however, has been confined to the southeastern quarter of the State, east of the coal-measure strata. Production by counties in 1892 was: St. Francois, 79,000 tons; Crawford, 13,800; Phelps, 1300; Franklin, 300; Dent, 24,800; Howell, 300; Iron, 7000; total, 126,500 tons. In preceding years iron ores were mined in nine other counties.

Three kinds of ore are exploited in the State, specular, red hematite and limonite. The first and best is found at the famous Iron Mountain and Pilot Knob mines. Both specular ore and red hematite are mined in large quantities in the counties of Crawford, Dent and Phelps. The limonite ores are low grade (47 per cent iron) and non-bessemer, but occur in great abundance in the southern and extreme southeastern counties. They will ultimately be of great value, though not mined to any extent at present. All the classes of iron ores were shown in the exhibit by representative specimens, but the Iron Mountain Company, which owns and operates the mines at Iron Mountain, furnished a complete series of all the grades of bessemer and non-bessemer specular ore which it produces, together with analysis of each. Up to and including 1892, more than 3,500,000 gross tons of ore had been produced at these mines, most of it of bessemer grade. Besides the samples of ores, the exhibit of the company consisted of specimens of the associated rocks and minerals, together with charts and photographs of the mines, mills and surrounding country. An interesting and instructive dissected model of the mountain showed the Archæan porphyry hill in which the vein ore occurred, surrounded by Cambrian limestone and sandstone, and indicated clearly the extensive underground workings in the detrital ore between the porphyry and the Cambrian strata.

The coal area of Missouri is generally stated to be 23,000 square miles. In many counties the beds lie very near the surface, and may be easily and cheaply worked. Beds as thin as 18 inches are mined with profit. "Coal pockets" lying in isolated position outside the main coal measures show coal over limited areas to the enormous thickness of 50 or even 70 feet. By far the largest part of the coal mined is bituminous, but some cannel of good quality is produced. In 1892 coal was produced in 33 counties to the total amount of 3,017,285 tons

As other states produce so much more coal than Missouri, and as the State had lead and zinc to fall back upon for her main display, the World's Fair Commission did not think it wise to lay special emphasis on coal, but contented itself with putting into the cases a good representative series of specimens, and placing one large lump of fine cannel coal outside.

Reviewing then the statistics of production of the four prominent minerals of the State, we have the following table (on the authority of Professor Winslow):

	1892.		Total to 1892.	
	Tons.	Values.	Tons.	Values.
Zinc ore	131,487	$2,862,475	1,117,500	$24,585,000
Pig lead	32,260	2,194,029	639,839	56,000,000
Iron ore	126,500	234,607	7,715,124	30,050,612
Coal	3,017,285	3,825,828	44,936,230	67,500,000
Totals	3,307,553	$9,116,939	54,408,693	$178,135,612

Missouri produces a very fine quality of barytes and ranks second in the Union in the amount produced. Sands adapted to the manufacture of plate and other kinds of glass occur abundantly in the eastern counties. Copper ore was mined extensively near Ste. Genevieve some years ago, but the diggings have been abandoned. Copper occurs in other places, also, but none is now mined in the State. Only one occurrence of silver is known, and that is an argentiferous galenite at the old Einstein mines in Madison county, which has not been worked for about 13 years. The quarrying and working of so-called "tripoli" (really decomposed chert) is a growing industry at Seneca, Newton county. The tripoli is used in making gravity and pressure water filters, and when ground makes an excellent polishing powder for metals. All these substances were well represented in the World's Fair exhibit.

The building stones of the State are numerous and beautiful, and were represented by slabs and dressed cubes. Red and gray granite from St. Francois and Iron counties; light gray crystalline magnesian limestone from Greenfield and Carthage, and from St. Louis; white non-magnesian limestone from Hannibal; gray, red, cream-colored and mottled marbles from near Fredericktown, Madison county; drab sandstone from Warrensburg, and yellow sandstone from Ste. Genevieve, indicate the extent and variety of Missouri building stones,

many of which are already favorably known outside the State. Many parts of the State, especially Crawford and Pulaski counties, contain deposits of "Mexican onyx" of good qality, some fair samples of which were displayed. More work should be done in developing this resource.

Superior fire-clays, stoneware clays, china clays and kaolin occur in great abundance in Missouri, besides clays suitable for common brick. The fire-clays especially have a high reputation, and the raw material and products are in demand all over this country and in foreign countries. An excellent representative series was shown in the exhibit, but its value was unfortunately impaired by lack of analyses, which were not obtainable.

Mineral springs, many of which are known to possess valuable medicinal qualities, are found in different parts of the State, but especially in the central and western counties. Recent study by the State Geological Survey divides them into five classes (P. Schweitzer): (1) Muriatic, (2) Alkaline, (3) Sulphatic, (4) Chalybeate, (5) Sulphur waters. No attempt was made to display these waters, but fine photographs of their property were contributed by the three most important companies which have built sanitaria at mineral springs. These were the Excelsior Springs, Pertle Springs and the Lebanon Magnetic Springs companies.

One of the main features of the exhibit was a relief map of the State on a scale of five miles to the inch, which was constructed expressly for the occasion under the direction of the State Geological Survey. In addition to the topography and geology of the State, the map showed, by appropriate conventional signs, the location of all the various sources of mineral wealth in her boundaries. Besides this map, the exhibit contained sectional relief maps on a much larger scale (1 inch—4000 feet, horizontal, 1 inch—1000 feet, vertical) of the Archæan region about Iron Mountain, the prairie and coal region of Ray county, and the zinc and lead region of Jasper county. All these relief maps received much attention from visitors. Charts and numerous photographs of scenery, mines, mills and caves adorned the tops of most cases in the exhibit.

MINES AND MINING.

Iron Mountain Co., Iron Mountain, award for model of Iron Mountain with charts and photos.

St. Joseph Lead Co., Bonne Terre, award for model of concentrating plants.

State of Missouri, Jefferson City, award for relief map of Missouri and photos.

American Tripoli Co., Carthage, award for Tripoli Rock Filter discs and plates, shale clay.

St. Louis Hydraulic Pressed Brick Co:, St. Louis, award for brick and fire-clays, clays.

Matteson Paint Co., Cape Girardeau, award for mineral paints.

Mepham & Klein, St. Louis, award for mineral paints.

Lanyon & Co., Nevada, award for zinc oxide for paint.

Matteson Paint Co., Cape Girardeau, award for collective exhibit of mineral paints.

Iron Mountain Co., Iron Mountain, award for photographs and charts of mills and mines.

James A. Reeves, Joplin, award for lead and zinc ore.

Iron Mountain Co., Iron Mountain, award for iron ores and minerals.

State of Missouri, Jefferson City, award for ores and zinc, lead, iron and associated minerals.

State of Missouri, Jefferson City, award for zinc and nickel ores and associated minerals.

St. Joseph Lead Co.. Bonne Terre, award for products of concentrated galena.

Picher Lead Co., Joplin, award for products from lead furnace (fumes).

Empire Zinc Co., Joplin, award for metallic zinc.

Empire Zinc Co., Joplin, award for products of concentration of zinc ores.

EDUCATIONAL AWARDS—GROUP 149.

Public schools, Harrisonville, bound volumes of pupils' work.

Public schools, Nevada, bound volumes of pupils' work.

Public schools, Mexico, bound volumes of pupils' work.

Professional schools, St. Louis, frame illustrating kindergarten training.

Preparatory normal school, Glencoe, nine volumes class work geometry and four volumes of drawing.

Kindergarten schools, St. Louis, frames and bound volumes, pictures and sewing.

Public schools, Kansas City, natural history collection, pupils' work in drawing; volumes of manuscript, book-keeping; volumes of manuscript, rhetoric and English; pupils' work in penmanship.

Public high school, Kansas City, volumes manuscript, natural science.

St. Louis school of fine arts, St. Louis, 15 samples of work by composition class.

Lewis F. Werneker, Clinton, portrait painting.

State of Missouri, Trinity, St. Louis, educational exhibit.

Public schools, Kansas City, volumes manuscript (grammar grades) and trigonometry.

Public schools, primary department, Kansas City, volumes manuscript.

High school, St. Louis, frames and volumes—drawings.

Public schools, St. Louis, volumes maps—third and eighth year work, relief maps, drawings, frames and volumes, cases and pièces of clay modeling.

Public schools, St. Louis, volumes manuscript in part by entire infant class.

CHEAP LANDS IN MISSOURI.

In order to answer the many inquiries addressed to this office asking for location and description of government and other cheap lands in Missouri, we have collected and now publish the following information.

For facts in regard to Government land we are indebted to registers at each of the three United States land offices, located at Boonville, Springfield and Ironton.

Gen. J. B. Douglass, agent for Agricultural College lands, has very cheerfully forwarded all information called for by this office, and will take much pleasure in furnishing intending purchasers with full and complete descriptions of each tract of land, its location as to schools, railroads. churches, etc., the price per acre and to what it is best adapted.

We would advise all parties who wish to settle in Missouri to come and see this land and make such selection as is adapted to the purpose for which you intend to use it. Much of this land is suitable only for the grazing and rearing of stock, and can be purchased at a price that will certainly make the business remunerative and profitable. Some is especially adapted to the production of fruit, and is known as the land of "Big Red Apples." Much of this land has the same soil, climate and other natural advantages possessed by the Olden Fruit farm, located at Olden, in Howell county, and said to be one of the most extensive fruit farms in the world. Here all varieties of fruit are grown to perfection, both as to appearance and flavor, and the farm is visited by buyers from all the fruit markets in the country, who select and purchase such fruit as may be demanded by their market, and pick, barrel and ship it themselves.

Other tracts are covered with heavy growth of valuable timber, that in the near future will demand the services of many laborers and prove a source of income to the fortunate owners.

After the timber is gone the land will be valuable for a variety of agricultural purposes.

Over the territory in which the land is located mineral deposits are the rule rather than the exception. Iron, lead, zinc, copper and bituminous coal abound in great quantities. There is no question but that land can be bought in Missouri today for $1.25 per acre, that in

the near future will yield such an abundance of valuable minerals as to make fabulous fortunes for its owners.

If you want cheap land upon which to make a permanent home, come to Missouri. Don't buy without inspection either in person or through a trusted agent. So far as the State is concerned, you can make no mistake in locating within her borders. Her people are intelligent and enlightened. Her agricultural and mineral resources are wonderful and her climate unsurpassed. School and church houses in every locality; a school fund unequaled by any state in the Union; a State University and Agricultural College that is the pride of the Mississippi valley. Railroads traversing the State in every direction; luxuriant blue-grass pastures, feeding herds of all the improved breeds of live-stock; fertile fields on hill and valley, producing corn, wheat, oats, barley, flax, timothy, clover, cotton and tobacco in great abundance, orchards producing fruit that will compare favorably in appearance with the great fruit-belt of the Pacific coast, and is unsurpassed in flavor.

With these blessings, with these necessities and luxuries and many other advantages offered, Missouri will make you a grand home.

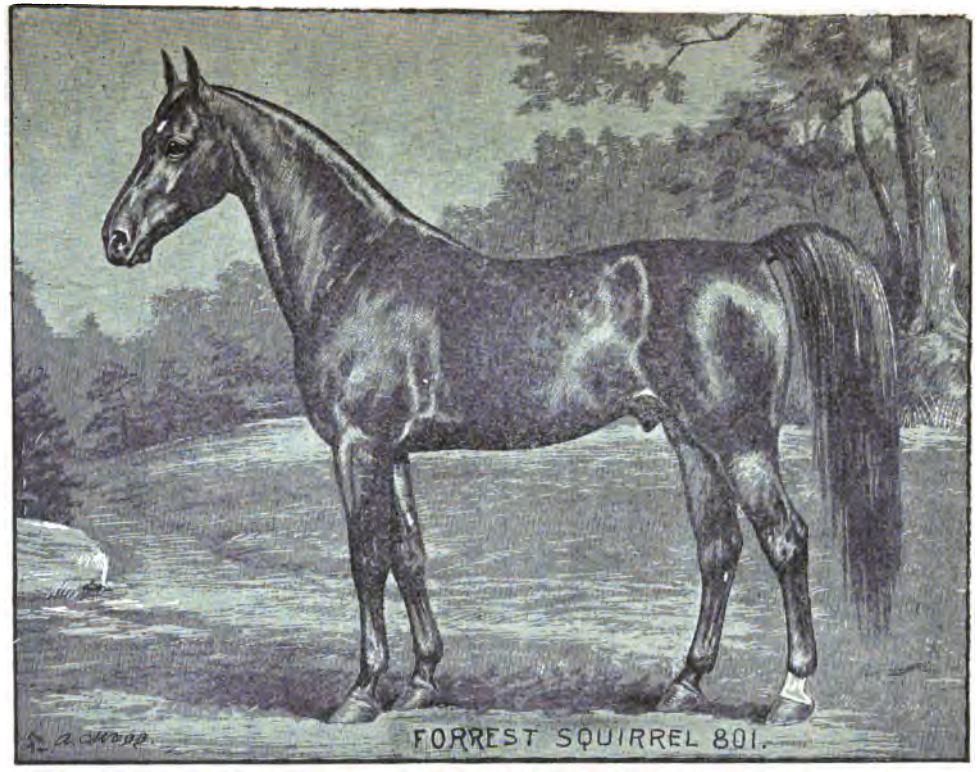
In fact, when we attempt to enumerate the wonderful resources and consider the multitude of advantages offered by the State, we become lost in the midst of their profusion, and are forced to the conclusion that nature has endeavored to locate a part of all the good things in Missouri, and has succeeded so far as it was possible without extending her borders.

AGRICULTURAL COLLEGE LANDS OF THE STATE FOR SALE.

These lands are located along the line of the St. Louis, Iron Mountain & Southern and St. Louis & San Francisco railways, and in the following counties: Crawford, Phelps, Pulaski, Laclede, Dallas, Polk, Cedar, Benton, Wayne, Butler, Ripley, Dunklin and Pemiscot. They embrace all kinds of lands, and persons seeking paying investments, as well as those desiring homes, will do well to examine them. We have endeavored to give a few facts in relation to and comments upon the lands in the various counties, with reference to their geographical position, climate and special adaptations. These we have gleaned from various sources and authorities, and believe them to be perfectly reliable. We offer the lands, aggregating about 70,000 acres, at exceedingly low figures, and invite the attention of the public to them.

The title to these lands is unquestionably as good as Government title, having been certified to the State by General Government, and by the State to the curators of the University. None of these lands have been assessed for taxes. Terms cash. For further information apply to

Gen. J. B. DOUGLASS,
Columbia, Mo.



FORREST SQUIRREL.

Saddle stallion, property of D. L. Parrish, 702 Olive St., St. Louis, winner of first prize in three-year-old stallion class at Chicago.

PHELPS COUNTY.—Surface is generally rolling, sometimes hilly. Soil is very good. Excellent wheat country. Very good for general farming. The county has quite extensive manufacturing interests. This county is traversed by the St. Louis & San Francisco railroad. This county contains 8518 acres of Agricultural college lands, appraised at from $2.50 to $12.75 per acre.

PULASKI COUNTY.—Surface is hilly and broken with numerous water-courses. The broad valleys are unsurpassed in fertility and productiveness. Much heavy timber. The upland is well adapted to cattle and sheep-raising, while the valleys are surprisingly productive in cereals. The entire county is well adapted to fruit culture. Grasses grow luxuriantly—excellent range for stock. Waynesville is the county seat, about 12 miles from the San Francisco railway. This county contains 3600 acres of College lands, appraised at from $1.25 to $2.75 per acre.

WEBSTER COUNTY.—This county lies directly west of Pulaski, possesses essentially the same features in point of topography, climate, water-courses, soils and other natural characteristics. Much attention has been paid to stock-raising, and it has been pursued with universal success. It contains 7145 acres of Agricultural College lands, valued at from $1.50 to $6.00 per acre.

BUTLER COUNTY.—Lands are situated in northeast part of county, some of it very near to Poplar Bluff, the county seat. Surface rolling and somewhat broken. Many fertile valleys and rich bottoms, well watered. A great deal of timber and ore in the county. Suitable for mining, farming and stock-raising. The Iron Mountain railroad traverses the county from north to south. This county has 12,805 acres of Agricultural College lands, valued at $1.25 to $5 per acre.

WAYNE COUNTY.— Situated in southeastern part of the State. Surface generally broken and heavily timbered. Valleys are fertile and well adapted to agriculture. Uplands suited to fruit-growing. The county produces a great deal of stock and wheat; while copper and lead are to be found in great quantities. The St. Louis and Iron Mountain railroad passes through the southwest portion of the county. It contains 9105 acres of College lands, valued at $1.25 to $1.75 per acre.

LACLEDE COUNTY.—This county is situated 1400 feet above the sea. The surface is undulating. A few prairies and an abundance of all kinds of timber. Wheat, corn and tobacco are raised extensively. Possesses all necessary features for stock-raising, and has the San

Francisco railway passing almost through the middle of the county. This county contains 6510 acres College land, valued at $1.25 to $4.00 per acre.

DUNKLIN AND PEMISCOT COUNTIES.—The surface is generally level; sometimes slightly rolling. These counties contain much valuable timber and an abundance of iron ore. Stock-growers will find these lands particularly desirable. These counties lie in the southeast corner of the State and contain 1120 acres of College land.

POLK COUNTY.—Surface is generally undulating, and in some portions broken. Nearly half the county is prairie; the remainder is timber land. The bottoms are fine agricultural lands. Chief products are corn, tobacco and stock. The timber is of an inferior quality. The county contains 1755 acres of College lands, valued at from $1.50 to $5 per acre.

RIPLEY COUNTY.—This county borders on Arkansas. Surface undulating and in some portions broken. Pine and cedar of great size are found in uplands. Soil in valleys very fertile. Corn, wheat, oats and stock are produced in large quantities. Grapes and other fruits can be cultivated to advantage on bluffs of Current river. Iron, lead and copper are abundant. Contains 9334 acres of College lands, valued at $1.25 per acre.

CEDAR COUNTY.—Surface generally rolling, sometimes hilly. Sac river and its tributaries water the county. Some good timber; also minerals. Adapted to farming and fruit-growing. Contains 1400 acres college lands, located in northeast part of the county, and valued at $1.50 to $3.60 per acre.

DALLAS COUNTY.—Located in southwestern central part of State, and is drained by Niangua river. Surface varies. Timber land is rocky, and the prairies slightly rolling. The soil is generally fertile, while the valleys are specially so. Good farming and fruit lands. Some lead ore in the county, and contains 3200 acres of college land, valued at $1.25 to $3.25 per acre.

BENTON COUNTY.—Surface is generally broken. About one-fourth of the county is rolling prairie, and balance rough timber land. Wheat, beef, pork, tobacco and mules are the products. Very fair farming and timber lands. Contains 2200 acres of College lands, valued at $1.25 to $2.50 per acre.

CRAWFORD COUNTY.—Surface is varied. High rolling prairies, upland and bottom timber. Fertile valleys. Good water. Fine agricultural, stock, grazing and mineral lands. Educational facilities good.

Has no debt. San Francisco railway runs through county. Contains 1640 acres College land, valued at $1.25 to $2.50 per acre.

TANEY COUNTY.—In addition to the lands above enumerated, the Agricultural College owns in Taney county two tracts of land, one containing 2520 acres in a compact body of two miles square. The other contains 2100 acres in compact form, being 2×1½ miles square. Both of said tracts are finely watered by never-failing springs, with an abundance of grass, and are within 25 miles of railroad.

SUGGESTIONS AND GENERAL INFORMATION AS TO ENTERING GOVERNMENT LANDS.

1. There are about 990,000 acres of land in this State belonging to the Government. The Agricultural lands are subject to homestead entry only. No lands are subject to private cash entry, except in the State of Missouri.

2. Homestead entries can be made for not more than one quarter section or 160 acres of land.

3. All applicants must stand upon equal footing, with equal rights and privileges to enter the public lands. "First come, first served."

4. The land fees and commissions, payable when application is made, are as follows:

On lands outside the railroad limits, $14 for 160 acres; $13 for 120 acres; $7 for 80 acres; $6 for 40 acres.

On lands within the railroad limits, $18 for 160 acres; $16 for 120 acres; $9 for 80 acres; $7 for 40 acres.

An entry of 80 acres will cost $10 fee besides the regular commissions, at either $1.25 or 2.50 per acre.

5. The applicant must in every case state in his application his place of actual residence, and the postoffice address, to which notices relative to his entry shall be sent, and his full name.

6. Amendments of filings and entries are allowed by the general land office by statute for real errors, where entries were made by mistake on the wrong tract, but not for blunders which the claimant could have avoided by reasonable care and investigation. Application for amendments must be sworn to and corroborated under seal, and in no case need be more than two pages in length; must show how the error was made; that applicant has not sold or encumbered the tract, and that the amendment is not asked for the purpose of letting some one else enter the tract vacated.

7. When a person desires to enter a tract of land on which he has not established a residence and made improvements, he may or may not appear personally at the district land office and present his application before the register and receiver. He must establish his residence in a house to be built on the land within six months from the date of entry, and must, in order to maintain his entry, reside on and cultivate the tract for five years, unless he desires to commute and pay for the land in cash or equivalent, which can be done after fourteen months' actual residence on and cultivation of the tract subsequent to the entry.

8. The homestead affidavit can be made before the judge or clerk of a court of record of the county where the land is situated, or before a commissioner of the United States Circuit Court having jurisdiction over the county, and save the journey to the land office. Where proof is made before any of these officers it must be done in the county where the land is situated.

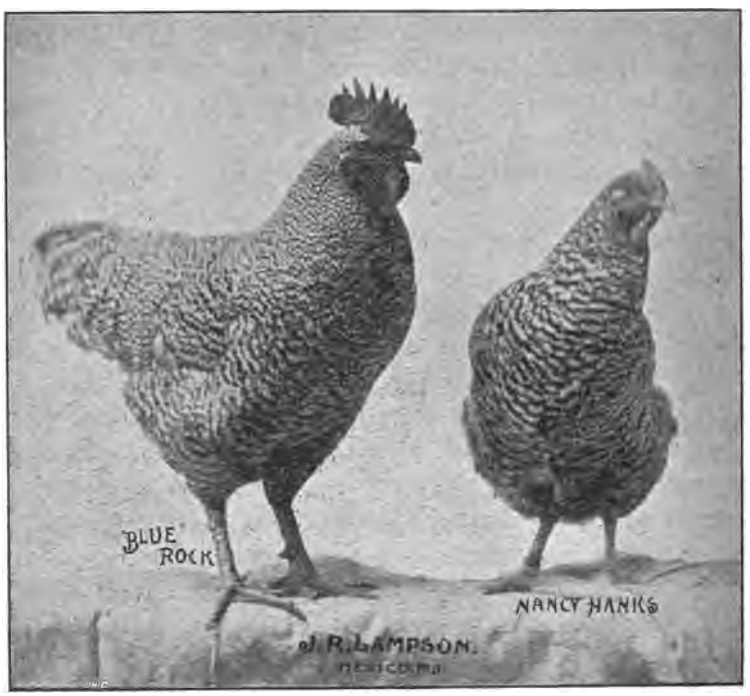
9. Entries under the homestead law can be completed after five years' actual residence; but the applicant is required to file with the register his intention to make proof, with the required fee for publication, and it is the duty of the register to have said notice published when the applicant will appear with two witnesses named in the notice, and make proof on the day named, and before the officer mentioned.

10. In case of death of entryman, his widow has the right at the proper time to make proof of his residence, and her residence or cultivation of the tract for the required time, and in case of the death of the widow, then the minor heirs of the entryman, and if not minor heirs, the adult heirs.

A homestead right cannot be devised away from the widow or minor children.

11. Under an act of Congress approved March 2, 1889, a party who has entered lands prior to said act has the right, where his entry has been canceled for any cause, to enter again, and, where his entry is of record, has the right to relinquish his claim to the United States and enter the same or other tract, provided no other right has attached; the act further provides that, where an entry has been made, and the applicant is residing on the land entered, which was for less than 160 acres, he has the right to enter, if adjoining, enough land to make 160 acres; or he has the right to make an additional entry elsewhere, after having proved up his first entry, the two entries not to contain over 160 acres.

12. Under act of Congress approved August 30, 1890, one person can enter only 320 acres of public land. This act is held to be prospective and not retroactive. That is, no matter how much land a party



BARRED PLYMOUTH ROCKS.
Property of J. R. Lampson, Mexico, Mo., and prize-winners at Chicago.

entered or settled on prior to the date of the above act, he may thereafter, if in other respects qualified, enter 320 acres, but no more. This law does not apply to mineral lands, but only to agricultural lands.

13. A party desiring to relinquish his land to the United States for the purpose of re-entering, or for the purpose of letting others enter, must make the following relinquishment on the back of his duplicate receipt, before some officer with a seal: "I hereby relinquish all my right, title, interest and claim in and to the within described lands to the United States." Relinquishment made at the land office can be made without any cost. In the event of the loss of the duplicate receipt, an affidavit accounting for the loss, made under seal, and relinquishment thereon, w ll be sufficient.

14. A single woman does not forfeit her homestead entry by marriage if thereafter she continues to comply with the law as to residence, improvements and cultivation, provided her husband is not attempting to acquire title to land at the same time where residence is required.

15. The first actual settler who makes entry within three months after actual settlement is entitled to the land, while the first man who makes entry may have been last to make settlement and hence have the least claim to the land. A pre-emption filing is no bar to a homestead entry.

16. A settlement does not mean actual residence, but preparation for it, to be followed up in good faith. The claimant should, in person, not by agent, start the erection of a house, or begin some other improvement on the land he claims. A homestead entry does not require prior settlement, but it is safest to make a settlement at the earliest date.

17. Final proof in homestead entries can be made after five years from date of entry or of actual residence on the land, and must be made before the expiration of seven years from date of entry.

The time which the homestead settler has served in the army, navy or marine corps during the civil war shall be deducted from the time heretofore required to perfect title, or if discharged on account of wounds received or disability incurred in the line of duty, then the term of enlistment shall be deducted from the time heretofore required to perfect title, without reference to the length of time he may have served; but no patent shall issue to any homestead settler who has not resided upon, improved and cultivated his homestead for a period of at least one year after he shall have commenced his improvements.

18. The receiver's duplicate homestead receipt, which the entryman received on making entry, should be surrendered on making commuted or final homestead proof. In making cash entry proof on preemption filing, it is not necessary to surrender the original certificate.

Parties are often put to a great loss and inconvenience by the loss of receiver's receipts, which should always be carefully preserved.

19. The application to make proof blank No. 4–348, homestead, should be signed by the claimant himself. His four witnesses should, if possible, be near neighbors, fully conversant with the facts essential to perfect proof, and it is advisable that none of them be relatives of the claimant.

20. It is the duty of the applicant who makes proof before county officers to see that each question is filled out with complete answers; must show that he is a native-born citizen of the United States, if such is the case, and, if not, then certified copy of naturalization papers will be sufficient; if the entry is by a woman, she must state specifically in the proof whether or not she is married or single; applicants should in every case see that the names of witnesses used in making proof are properly advertised, and that they sign their names as advertised; and in giving the names to be published they should ascertain and give their full christian names, and, if possible, the four living nearest the land for which proof is to be made. Much trouble and delay has been occasioned by doubtful or different spelling of names. Some persons have actually spelled their names in three ways in making one proof. This makes necessary correspondence and explanatory affidavits, causes delays in receipt of patents and places suspicion on proof.

21. The proof should, if possible, be taken on the day advertised, before the officer advertised, with the evidence of at least two of the witnesses advertised—these, together with the duplicate receipt and the required fees and commissions, to be sealed up and transmitted to the receiver on the same day proof is taken.

22. The land office commissions, payable at the time of making final homestead proof, are as follows. On land outside of railroad limits:

For 160 acres	$4 00
For 120 acres	3 00
For 80 acres	2 00
For 40 acres	1 00

On land within the railroad limits:

For 160 acres	$8 00
For 120 acres	6 00
For 80 acres	4 00
For 40 acres	2 00

The fees for reducing testimony to writing in making final proof are 15 cents for each 100 words, which in each case amounts to $1, sometimes $1.50, which must be transmitted with the other final proof commissions.

23. All applicants for lands should see that their applications are made out for the exact numbers of land desired to be entered, which must lie and form a compact body. If for an adjoining farm, the land owned and resided on must form a compact body with the public land, and the two together must not exceed 160 acres.

24. A married woman has no right to make a homestead entry.

25. A single woman over the age of 21 years has the right to make a homestead entry.

26. A man has to be 21 years of age to make an entry, unless he is married or the head of a family.

27. If a married woman who has been deserted by her husband desires to prove up, she should address the local officer of the land office, stating the nature of her case, and ascertain if she has the right to make proof.

28. In case of the death of both father and mother, the guardian of the minor children, after obtaining the required order of the probate court within two years of the death of the surviving parent, may sell the land for the exclusive benefit of such minor children, and patent will issue to the purchaser on payment of the office fees.

29. The widow or children of a homesteader are not required to reside on their homestead after his death, but must continue cultivation by agent or otherwise. The widow can enter a homestead in her own right while cultivating that of her deceased husband, in which event she must actually reside on the land entered in her own name.

30. In contests initiated by affidavit, the affidavit should be corroborated by preferably two witnesses. When service is had by publication, the posting of a copy of notice on the land, and mailing (by registered letter) a copy to contestee to his address if known, and to postoffice nearest land, are absolutely essential, as is also proof to both, and this is the duty of the parties or their attorneys, not of the land officers.

31. Where parties desiring to file protest against an entry on day of proof, it is the duty of the officer taking the proof to take down his testimony and that of his witnesses, and transmit the same with the proof to the local office, the party protesting paying the cost of reducing the evidence of himself and witnesses to writing.

32. The Government does not issue a general map showing what are public or untaken lands. Land officers are authorized by law to

furnish plats or diagrams showing what lands are vacant and what lands are taken. Parties writing for numbers, dates, descriptions, etc., of several tracts can get this information by ordering plats.

The charges to be made by the local officers for the plat or diagram of a particular township are fixed as follows:

For plat showing what land is public and what entered	$1 00
For plat showing entries and names of claimants	2 00
For plat showing entries and names, numbers and character of land	3 00
For plat showing entries and names, numbers and character and date of entry, together with topography	4 00

For plat or diagram of a part or township or section, a proportional amount is charged.

33. Any person desiring information about public land should always give the section, township and range for which information is asked, together with the numbers of land, and such information will always be furnished free of charge.

34. When patents are received at this office, the register and receiver at once prepare notice and send to the entrymen, when they can return their duplicate final receipts given them when proof was made, and patent will be sent free of charge.

35. Papers once filed cannot be returned, unless it be to correct a clerical error.

36. It is the duty of the applicant when he makes application to ascertain the exact area in the tract, and if over 160 acres, he must, in addition to the entrance charges, pay for the excess over 160 acres at the rate of $1.25 or $2.50 per acre, according as the land is minimum or double minimum. Many parties have lost their lands by failure to send the excess.

37. Where an entry is made for land that has been covered by a prior entry, the residence will date from the time when the last entry is placed of record, or from date of cancellation of the first entry, if settlement was prior to the date of cancellation.

38. No person who is the proprietor of more than 160 acres of land in any state or territory shall acquire any right under the homestead law.

39. A homesteader forfeits his entry if he transfers any portion thereof before final receipt issues, except it be for school, church or cemetery purposes, or for the right of way of railroads, canals, or ditches for irrigating purposes.

40. Land warrants and other cheap scrip can be used in preemption and commuted homestead entries under some circumstances. Before buying scrip, claimants should consult the local officers.

41. The Secretary of the Interior is authorized, upon proof being made to his satisfaction that any tract of land has been erroneously sold by the United States, so that from any cause the sale cannot be confirmed, to repay to the purchaser or to his legal representatives or assigns the sum of money which was paid therefor, out of any money in the treasury not otherwise appropriated.

42. In case of applications for repayment where patent has not issued, the duplicate received must be surrendered. The applicant must also make affidavit that he has not transferred or otherwise encumbered the title to the land, and that said title has not become a matter of record. This affidavit may be made before either the register or receiver of the district land office, or before a notary public or a justice of the peace, or other officer authorized to administer oaths. When made before a notary public or a justice of the peace, a certificate of official character is required.

43. Parties who have made entries of less than 160 acres of land are, under some circumstances, allowed to enter enough more land to make up 160 acres. In some cases they are permitted to relinquish their entries and make new entries. A full statement of the facts in each case should be submitted to the local officers for their judgment and advice.

44. Parties who desire to enter public lands should send to the general land office for a pamphlet dated February 6, 1892, which will be sent free of charge to all applicants.

45. The Commissioner of the General Land Office expressly forbids the local officers to furnish blank entry papers and affidavits to anybody except claimants in person. Land office blanks can be obtained of Henry N. Copp, Washington, D. C.

LIST OF GOVERNMENT LAND, SPRINGFIELD DISTRICT.

UNITED STATES LAND OFFICE,
SPRINGFIELD, MO., August 7, 1893.

J. R. RIPPEY, Esq., Sec'y, Columbia, Mo.:

SIR—Owing to an erroneous estimate of the lands vacant in this land district some years ago, all reports since then up to this time have been incorrect. There is more than was represented.

July 1, 1893, this office made a report to the honorable Commissioner of the General Land Office, as approximately correct as could be, as follows:

Counties.	Acres.
Polk	1,000
Dallas	17,000
Laclede	21,000

Counties.	Acres.
Pulaski	6,000
Webster	7,000
Wright	22,000
Texas	8,000
Christian	16,000
Douglas	48,000
Ozark	108,000
Taney	156,000
Stone	60,000
Barry	30,000
McDonald	40,000
Total	600,000

Very respectfully,

JOSEPH W. MCCLURG,

Register.

In another letter to this office Mr. McClurg says: "In this State vacant lands can only be homesteaded or cash entered. The timber-culture law does not apply to lands in this State. In this district there is about 100,000 acres, all entirely west of Springfield, all along the lines of the Atlantic & Pacific railroad and within 20 miles of it, that is subject to homestead only, and at double minimum prices. The minimum priced land can be either homesteaded or cash entered to the extent of 320 acres."

GOVERNMENT LANDS SUBJECT TO ENTRY AT BOONVILLE OFFICE.

SIR—Replying to your letter of the 19th inst., would state that on June 30, 1892, our approximate report to Commissioner of General Land Office of vacant lands in this district by counties was as follows:

Counties.	Acres.
Benton	9,962
Cedar	960
Dallas	2,854
Laclede	26,551
Miller	6,983
Phelps	400
Pulaski	34,172
Crawford	783
Hickory	13,394

Counties.	Acres.
Maries	4,800
Morgan	631
Polk	1,000
St. Clair	10,737
Camden	106,600
Total	245,520

Very respectfully,

WM. MCCRACKEN,

Register.

IRONTON DISTRICT.

UNITED STATES LAND OFFICE,
IRONTON, MO., Aug. 21, 1893.

Secretary Board of Agriculture, Columbia, Mo.:

DEAR SIR—From report recently made to land department, we find the number of acres of land in this district subject to entry to be 146,131.

The official plats of this office do not give county lines, and no report has ever been made by counties that I am aware of. The great body of the government land will be found in the counties of Howell, Texas, Oregon, Shannon, Phelps and Pulaski.

It is all open to homestead. We have no double minimum or $2.50 per acre land in this district. It is all $1.25 per acre. No timber-culture entries can be made. Plats showing vacant lands are made from the official plats and other records, and cost $1 per township of six miles square.

Very respectfully, etc.,

JAMES C. NOELL,

Register.

CROP REPORTS.

Summary of condition of winter grain and live-stock, April 1, 1893, in Missouri, with estimate per cent of loss during winter.

Summary of returns.	State.....	Northeast..	Northwest..	Central.....	Sotheast....	Southwest..
Wheat, percentage condition.....	82	76	81	79	85	86
Rye, percentage condition.....	86	84	86	82	89	89
Horses, comparative healthfulness, per cent.	99	99	99.5	98	99	99
Horses, loss per one thousand head.....	12	9	11	12	13	12
Cattle, comparative condition, per cent.....	98	99	99	97	95	98
Cattle, loss per thousand from exposure.....	10	8	10	11	10	10
Cattle, loss per thousand from all causes.....	19	18	19	18	20	17
Sheep, comparative condition, per cent.....	99	98	99	98	98	99
Sheep, loss per thousand from exposure.....	13	11	14	13	11	9
Sheep, loss per thousand from all causes.....	24	24	23	28	34	19
Hogs, comparative condition, per cent.....	98	96	100	98	99	98
Hogs, loss per thousand.....	49	40	51	54	55	44
Hogs, percentage number of breeding sows.	78	76	81	75	80	80

The condition of winter wheat as estimated from returns of correspondents at this date gives an average for the State of 82 per cent, as compared with 68 per cent one year ago.

As reported by sections, the lowest average condition is 76 in northeast, and the highest 85 in Southeast Missouri.

The average date of wheat-seeding last fall was September 25, ten days earlier than the previous year, but the condition of the soil was bad and much of the seed failed to germinate, or at best made a weak spindling growth.

The low temperature, the very little protection afforded by snow, and the ice which in sections of the State covered the ground for a period during the winter, indicate that much of the area sown has been winter-killed; but the continued cold weather has prevented a

sufficient growth of the plant to make it possible to estimate the probable acreage which will be plowed up.

When compared with the condition April 1, of an average year, the prospect for a wheat crop is bad, but when compared with the prospect last year at this date, and we remember that, on the area sown, a fair crop in both yield and quality was produced, there is reason to take courage.

Rye was less injured than wheat by the severe winter, and is 11 points better in condition than April 1 of 1892. The area is below that of an average year.

At the end of March oat-sowing had only commenced.

The dry, cold weather was favorable to live-stock of all kinds, and the comparative condition is high.

Among horses there were fewer cases than usual of distemper or glanders reported, and no epidemic of any kind.

Cattle have been also comparatively free from disease, more than 50 per cent of the death rate reported being from exposure and too little food.

Except for the destruction among sheep from dogs, the death rate was chiefly from loss of young lambs, owing to the long-continued cold in March.

The high price and demand for marketable hogs would naturally induce good care and shelter and consequent high condition and freedom from disease. Cholera, in its various forms, is reported from almost every section, but the death rate has been comparatively very light.

The number of breeding sows now on hand is 22 per cent less than at this period in 1892.

May, 1893.

Summary of returns.	State.....	Northeast...	Northwest..	Central.....	Southeast...	Southwest..
Winter wheat, average condition.....	77	61	68	78	84	89
" likely to be plowed up.....	15	33	19	12	5	5
Area of oats compared with 1892	100	104	108	97	94	99
Winter rye, average condition.....	79	68	81	79	83	83
Winter barley, average condition.....	92	.....	.....	92	90	93
Meadows, mowing lands average condition.	90	86	87	90	92	91
Spring pasture, average condition.....	90	89	86	90	91	89
Cotton planting, percentage done.....	41	.....	.....	41	68	35
" " usually done....	61	.....	.....	61	78	55
Spring plowing, percentage done.....	62	46	68	62	80	55
" " usually done....	72	59	71	72	80	72
Peach buds, percentage alive.....	46	64	63	52	36	15
Apple buds, condition of	59	64	72	59	50	55
Condition of strawberries.....	62	75	71	62	46	58
" raspberries	68	70	75	68	64	63
" blackberries	74	69	84	74	74	73
" grapes.....	70	83	92	70	42	68

Agriculture gained nothing by the first ten fine days in April, as since that date the weather conditions have been most damaging. The low temperature and excessive rain in all except the northwest part of the State has stopped all farm work, soaked or submerged all wheat on flat land, prevented germination or washed out the corn plant, necessitating replanting, cutting garden vegetables and potatoes to the ground or rotting the seed.

In the sections of the State where a month ago the fruit was most promising, the greatest injury has been done—just how much is difficult to determine, as horticulturists differ widely in their expressed opinion of the peach-buds yet alive. Apples are injured, both tree and fruit, as are also all berries.

WHEAT—

The condition of the plant varies greatly in the sections of the State. In the northeast, where the ice did most injury, one-third of the area planted last fall has been plowed up, and the condition of that left standing is very low.

In the northwest, the great wheat-growing counties of Missouri, the late sown on upland was badly frozen out, and yet more of the weakened plant was killed by the dry winds of early April. A much greater acreage in this section would have been plowed up but for the fact that grass had been seeded with the wheat. The condition of that left standing has improved since the rains began, and from Caldwell county we hear: "Wheat sown early on the bottom land, while slightly damaged by the grasshoppers in the fall, is looking fine;" and from Harrison, "wheat in best possible condition."

Central—In these counties, on well-drained low land the wheat is making vigorous growth, but adjacent to creeks the condition has been lowered by overflow. On flat, poorly-drained land the per cent of condition has been lowered in the past month, and on upland a large area is worthless and will be plowed up.

Southwest—Has much the best prospect for wheat, and while reports from adjoining counties and even in sections of the same county are conflicting, the early sown on land in good condition is well stooled and growing nicely. The late sown was more damaged by absence of snow protection, some fields being thin and spotted, particularly that on flat prairie land badly drained.

Southeast—In the river counties the wheat prospect has improved during the month, the cool, wet weather permitting it to stool and thicken up, and it now looks well. In some of the counties having many small streams a large area was submerged and the color is bad.

RYE—

Is not very widely sown, and was affected by the cold, dry winter and want of protection by snow, much the same as wheat; so the condition is low.

OATS—

The area of this crop has been increased in the northeast and northwest sections, but the remainder of the State is not quite up to an average. The plant has made little growth, and the stand, especially of that planted late, is not very good.

Clover was badly winter-killed, and the late freeze turned it black, and pasture is yet short—not good enough for stock to be turned on in the north part of the State, and in many other counties too wet to be grazed. There is, however, a marked tendency to increase both the

pasture and mowing land, especially in counties where there is good market for dairy products.

Some counties report more cotton planted than last year, but the total area planted is one-third less than usual at this date.

Spring plowing was in full force in early April, but has been at a stand-still for the past two weeks. A large area of corn was already planted when the rains came, and much of it will have to be replanted; but as the wheat land plowed up is of the best, and the soil, particularly in the northwest counties, is reported in a fine condition, there is plenty of time yet, with favorable conditions, to plant a very large corn area in May. The bulk of the corn was planted last year after June 6.

The Irish potato area is to be very largely increased. Varieties, amount of seed and protection against insects recommended in this report.

The summary of most carefully compiled reports of the fruit crop from every county in the State shows that there is yet a prospect for a fair crop of peaches, for if only one-third of all the peach-buds set prove yet to be alive, we may have an abundant crop; but as the greatest damage was in the section where are the largest orchards, the injury may be greater than now estimated. The condition of apples and berries is low.

June, 1893.

Summary of returns.	State.....	Northeast...	Northwest..	Central.....	Southeast....	Southwest..
Wheat, acreage compared with last year.....	92	75	92	90	100	100
Wheat, average condition.....	81	68	76	83	87	89
Oats, acreage compared with last year.....	101	103	107	98	95	100
Oats, average condition.....	94	90	94	98	93	96
Clover, acreage compared with last year....	93	97	86	91	99	91
Clover, average condition.....	89	84	85	98	93	87
Pasturage, average condition.....	95	94	95	97	96	94
Potatoes, acreage compared with last year..	102	106	108	95	97	103
Apples, average condition.	49	57	66	46	50	25
Peaches, average condition.....	53	81	80	44	50	13
Berries, average condition.....	69	75	77	68	65	61
Grapes, average condition.....	80	86	95	71	73	78

Wheat, acreage.—The acreage of wheat sown last fall was 106 as compared with the area of 1891. The estimated area plowed up this fall was 15 per cent of the area sown, leaving an acreage of 91 per cent, as compared with last year, and the correspondents report this month 92 per cent, as compared with last year. So nearly the same result from so widely different methods certainly indicates accurate estimates.

Wheat, condition.—The estimated average condition for the State is four points better than one month ago, and the estimate of 81 per cent, while believed to be reliably correct, may not be generally credited without some explanation. Wheat in the southwest counties is reported excellent, and in the southeast and central counties the condition is fair. The census gives to these counties a greater wheat acreage than in the remaining counties in the State, so that, basing estimates on that return, the acreage where the condition is fair or good is greater than in the northern counties where the condition is poor. It is probable that the heavy storm the last days of May, too late for the effects to be noted by the correspondents in their report for this month, may materially reduce the comparative condition a month hence. Chinch-bugs are numerous in the southwest where wheat is best, but it is yet too early for them to do much damage. Every farmer should plan for a rotation of crops which will put his land in the highest state of productiveness. Rank, thrifty growing crops shade the ground earlier, and the chinch-bugs cannot prosper in the shade. This pest does not touch clover, and the time should come when one-fourth of every farm in Missouri is regularly in clover.

Clover, acreage.—Clover is low, both in area and condition, as compared with last year, due, some correspondents assert, to winter-killing; while, by other reporters, the loss is attributed to summer-killing last season. Clover is a biennial plant, though some stalks of it live longer. If the mowing or pasturing is done so as to allow no seed to scatter, the clover field will be nearly bare the third season after seeding.

Pasture.—The improved condition of pasture, five points, is due to the increased temperature of the advancing season and plentiful rains.

Oat acreage.—The oat area is increased in nearly all counties of the State and the condition is good.

Irish Potatoes.—The acreage of Irish potatoes is largely increased in all but a few counties.

REPORT ON FRUITS.

MISSOURI STATE HORTICULTURAL SOCIETY,
SECRETARY'S OFFICE, June, 1893.

From over 500 letters received from our best fruit-growers of the State I compile the following:

The cold, frosty, rainy, backward spring has again damaged our fruit crop very seriously indeed. Perhaps it is not right to attribute it all to the spring, for last spring, summer and fall were very unfavorable to our orchards.

The injury to the trees and vines one year ago was so great that they did not recover from it, and many orchards did not have a healthy leaf growth all summer. Of course it was impossible for the trees to form healthy fruit buds without healthy leaves; therefore, we see the effects of the past year's injury very perceptibly on all our fruits.

The strawberries, raspberries, cherries and apples have shown the bad effects more than anything else. With this bad starter we are not surprised that, after the very unfavorable spring, we have no very encouraging report to make on the condition of our fruits. Enough is it to say to our fruit-growers, that fruit will be scarce all over this western country, and it well behooves you to take care of every bit of fruit you may have this year. It will pay.

Not one report from this State, nor from any other state in fact, gives an estimate of a full crop. In fact some report an entire failure, while others give a full three-fourths of a crop. Wherever the apple made a good growth, and the cold rain did not last so long as to wash away all the pollen, there will be a fair crop only.

The late frost killed most of the peaches when in bloom, while farther north they were not injured because not so far advanced. It has been a year of anomalies: where we expected much we find little; where we expected little we find much. The year since last June has shown us how little we know about locations, weather, soils, and a thousand other matters in fruit-growing.

The strawberry crop, to particularize, has been light, and will be so all over the State. It is an exception to see otherwise.

Raspberry canes were injured during last summer and fall to such an extent that there will not be one-half a full crop at the most.

Blackberries will be plenty where the rust has not injured the canes. Some are injured by the winter, but not so much as was expected.

Grapes.—In many counties the first buds were cut off by a severe frost, but the second buds have given promise of a fair crop after all.

Cherries have dropped so badly that we cannot expect more than one-third of a crop. The weakened condition of the trees, the cold rains and frost are the cause of this failure.

Plums are nearly a failure.

Peaches will be a moderate yield in most of the northern and central counties of the State, while in the southwest the failure will be almost total on account of the freeze in blooming time. In southeastern and southern parts of the State the crop is very spotted. One thing is sure—it does not pay to plant peaches on low land. In some instances the fruits were killed on some farms, and yet on those adjacent there will be a fair crop. We may be sure there will be no great surplus of peaches this year, and yet the crop scattered all over the State will give us a good many in the aggregate.

Pears do not cut much figure in our general fruit crop, and we will have about one-half the usual amount.

The apple is our standard, and we miss it more than the others, and yet we cannot give as favorable a report as we would like. The crop will be very spotted for the reasons given before. The man who has a fair crop may consider himself fortunate, while he who has less than a half crop may find it more valuable than a full crop in an ordinary year. Not over one-half crop, and perhaps less, will be the quota of this State.

L. A. GOODMAN, Secretary.

July, 1893.

Summary of returns.	State.			Northeast.			Northwest.		
	1893.	1892.	1891.	1893.	1892.	1891.	1893.	1892.	1891.
Corn—									
Acreage compared with last year	102	87	98	104	82	100	106	94	96
Average condition	92	78	86	91	78	95	95	81	76
Wheat, average condition	79	84	99	62	76	103	76	77	91
Rye, average condition	88	84	99	82	72	99	87	85	97
Oats, average condition	101	83	80	104	75	97	103	74	85
Irish potatoes—									
Acreage compared with last year	106	88	102	106	72	110	114	93	108
Average condition	104	82	100	104	66	102	108	88	98
Sweet potatoes—									
Acreage compared with last year	94	91	97	93	81	106	97	93	96
Average condition	92	89	94	98	80	99	90	91	91
Sorghum—									
Acreage compared with last year	94	83	92	99	71	100	94	86	86
Average condition	87	79	89	93	71	94	88	78	82
Tobacco—									
Acreage compared with last year	95	88	93	91	80	94	87	85	96
Average condition	89	87	93	91	97	98	89	76	93
Wool—									
Amount sheared compared with last year	109	102	93	104	103	102	108	101	101
Average weight of fleece, pounds	5.6	5.5	6	6	6.5	6.5	7	6 9	7.2

Summary of returns.	State.			Northeast.			Northwest.		
	1893.	1892.	1891	1893.	1892	1891.	1893.	1892.	1891.
Cotton, average condition	81	70	101	.....	....	.....	....	.....	.....
Clover, average condition	87	94	100	76	92	100	78	93	102
Timothy, average condition	92	91	102	88	90	102	94	88	106
Pasture, average condition	97	92	103	95	90	104	99	85	109
Apples, average condition	29	56	76	36	41	69	31	50	85
Peaches, average condition	47	40	96	61	44	85	32	29	89
Grapes, average condition	77	81	91	86	81	95	93	79	101
Flax—									
Acreage compared with last year	79	41	127	78	.....	113	98	.....	105
Average condition	87	98	96	75	....	97	93	.....	88

Summary of returns.	Central.			Southeast.			Southwest.		
	1893.	1892.	1891.	1893.	1892	1891.	1893	1892.	1891.
Corn—									
Acreage compared with last year	104	82	97	100	88	99	100	90	99
Average condition	91	75	80	91	76	94	93	70	85
Wheat, average condition	83	78	102	85	93	97	89	94	102
Rye, average condition	86	85	98	85	81	100	99	94	98
Oats, average condition	101	89	79	97	90	82	103	86	85
Irish potatoes—									
Acreage compared with last year	107	88	108	101	94	90	108	88	98
Average condition	97	83	97	104	93	101	105	88	100
Sweet potatoes—									
Acreage compared with last year	92	92	94	96	94	100	93	95	96
Average condition	93	91	95	92	93	94	92	90	94
Sorghum—									
Acreage compared with last year	95	82	90	92	84	93	94	88	92
Average condition	82	76	89	88	86	92	92	83	84
Tobacco—									
Acreage compared with last year	97	85	80	97	96	103	97	91	101
Average condition	89	86	87	85	94	88	94	88	99
Wool—									
Amount sheared compared with last year	115	97	100	104	98	87	114	98	101
Average weight of fleece, pounds	5.5	5.1	6	5	5 1	5.5	5	4.7	5
Cotton, average condition	....	.....	.....	73	72	101	97	66	99
Clover, average condition	93	97	99	93	96	98	92	90	101
Timothy, average condition	93	95	103	94	92	94	93	90	101
Pasture, average condition	97	95	104	98	94	98	94	95	102
Apples, average condition	25	53	67	37	65	83	15	59	74
Peaches, average condition	28	43	99	50	52	96	19	26	107
Grapes, average condition	71	79	82	63	89	82	70	93	95
Flax—									
Acreage compared with last year	76	.....	138	.....	....	.....	78	.....	150
Average condition	74	.....	100	.....	.....	.....	94	.....	97

To afford an opportunity for a correct estimate of the acreage and condition of the several cereals and fruit crops at this date in Missouri, the returns for July 1, 1891 and 1892, are included in the foregoing summary.

The crop of 1891 was an unusually good one, while that of 1892 was exceptionally bad for all products. It should be borne in mind that the acreage is compared with that of last year, while the estimates on condition are compared with an average year, 100 per cent being the standard.

The weather for June, since the first week, had a most favorable effect on all growing crops, except for the heavy winds and excessive fall of rain of the 21st and 24th ult., greatly damaging houses, fences and all growing crops in localities; but fortunately the storm area was too limited to perceptibly affect the average percentage condition estimated for the State, and a careful examination of all returns gives every reason to be cheerful over the crop outlook at this date.

CORN.—The acreage of corn for the State is much above that of last year, but only 90 per cent of that of an average year, or, approximately, 5,700,000 acres.

The bulk of the corn crop was planted from 10 to 20 days late, and for that reason is not fully up to the average in condition at this date, but is generally clean, well cultivated and making splendid growth.

WHEAT.—In the southern half of the State wheat harvest is in general progress, and much of the crop already in the shock in good condition. From the southwest the majority of the reporters yet say, "best crop in years," but the very latest reports, after cutting had begun, are that "wheat has declined very rapidly as the dough hardened, and the grain is small and shrunken," "the cause supposed to be too much wet weather."

Should the reported decline prove to be general, the estimated condition for the State would be materially reduced, because the southwest has all the season given the highest comparative condition.

In the northwest the heads are reported "filling well," and prospects for a fair crop. The central was the storm-swept section, and consequently some reports are low, but in counties where harvest is in progress the yield is estimated higher than was earlier expected.

From the northeast, reports of a "fair condition" were received from a few counties, but the courage seems to have all gone out of the great majority of reports, so far as wheat is concerned, and the estimated average condition for the section is very low.

RYE.—Grown to only a limited extent, is comparatively in a better condition than wheat.

OATS.—In every county in the State oats promises the best in years. A little damage from rust and also some injury by insects is reported, but the crop is too near made to fear much reduction in the above high estimate.

IRISH POTATOES.—The acreage planted to Irish potatoes is greater in every section and almost every county than last year, and the present condition is excellent.

SWEET POTATOES.—Not grown so extensively as the other variety, and neither the acreage nor condition at this date quite equals that of an average year, due, probably, to press of other farm work.

TOBACCO.—The area planted to tobacco is a little less than last year, and the average condition is low.

SORGHUM.—The cultivation of this crop for commercial purposes has little place in Missouri agriculture, and it is steadily decreasing.

The area of 1892 was very limited, and is for this season still more restricted. The condition is fair.

WOOL.—The substantial increase in the estimated amount of wool sheared, as compared with 1892, is due to the slight increase in average weight per fleece on the large increase in number of sheep in the State.

COTTON.—Reported grown for commercial purposes in but six counties in the State, and not in one of the counties is the estimated acreage up to an average year; but the estimated average condition, while low, is much better than one year ago at this date.

CLOVER.—Reports of the condition of the clover plant are very conflicting. In the north part of the State the estimated condition is very low, owing to the unfavorable climatic conditions during the past twelve months; from St. Charles county the crop is reported destroyed by the army worm, and earlier complaints of damage by the clover-leaf midge came from the southeast. The damage from the midge seems, however, not to have been extended, for the estimated condition of the southeast is very good, as is also the condition in the southwest and central counties.

Anything like an accurate estimate by counties of the acreage of clover is not possible, but from all available data it seems that the acreage of clover in the northern counties of the State is greatly in excess of those in the south, and that being the case, the low condition in that section would affect the general average for the State to a greater extent than appears from the summary.

Where the clover must be turned under, the following from Henry Wallace's "Clover Culture" may aid to properly conserve the fertility of the land:

A rotation specially adapted to locations where winter wheat is a reliable crop, and where potatoes, by reason of market facilities, are profitable, is: First, clover; second, potatoes; third, winter wheat.

This in many respects is an admirable rotation. In fact it fulfils all the requirements of an ideal rotation. Clover turned under early in the fall, say in August or September, forms the very best preparation for a large and profitable crop of potatoes. The clover being in itself an admirable cleaning crop, the culture of potatoes is an easy matter. There are comparatively few weed seeds to germinate and give trouble, and these can easily be kept down in the cultivation of the potatoes. It besides furnishes in available form and in great abundance the elements of fertility which the potato needs. The potato can in turn be removed from the ground in time for a crop of winter wheat, with or without plowing, preferably without, as the potato ground furnishes the solid bottom for the seed-bed, with loose, mellow soil on top. Seed can be planted on this with a press drill as early as is desirable, and speedy and vigorous germination will follow. Winter wheat again is one of the best nurse crops for clover.

TIMOTHY.—Is slightly better than one year ago, and the crop, where haying has commenced, is being secured in good condition.

PASTURE.—Is very heavy and fine.

FRUIT.—Reports on the apple crop are becoming more uniform—uniformly bad—for correspondents who earlier thought there would be a fair crop of apples have gradually reduced their estimates, until the average has now about reached what many well-informed and conservative fruit-growers earlier predicted. There are no Ben Davis at all, and when it is remembered that this variety has steadily grown in favor for the commercial orchard—an eminent horticulturist recommending that 99 per cent of the trees planted should be of that variety—it is not difficult to believe that the per cent of a crop is very low.

The veteran horticulturist, Samuel Miller, summarizes the fruit prospect for his county and fairly expresses the situation throughout the State:

The strawberry is past and the poorest crop in 25 years. Late frost, hailstorms and excessive rain while in blossom seem to have been the cause. Cherries, all the finer varieties are past, and although promising fair crop up to nearly ripening, turned out slim, and many of the cherries were imperfect. Raspberries will average a fair crop of the black cap, but the red ones, Colossal in particular, were but a fourth of a crop. Blackberries look all right for an average crop, and will be appreciated in the absence of other fruit in its season. No plums, no apricots, no pears, but very few apples, not many peaches, as they are dropping off, owing to the curculio, no doubt, which in the absence of plums attacks the peach. The growing of perfect plums and peaches will soon be impossible unless we jar the tree and destroy the curculios and gougers; as spraying with the usual solutions

does not seem to keep them off, and is not a safe thing to use on plum and peach trees. Our greatest hope for fruit was and may be yet, the grape crop. Although the frost cut some of the buds and the hail-storm knocked off many of the first, there were still enough left for a good crop. The mildew and rot are to contend with, both of which had commenced here when I gave them a spraying with the Bordeaux mixture, which seems to stop the trouble. But hot, showery, humid weather breeds the fungi, and I fear we will have further trouble.

FLAX.—Of the 45 counties growing flax in 1889, but 22 report an acreage this month, and in these less than 80 per cent of the acreage of last year is grown. The condition varies little from one year ago.

CASTOR BEANS.—An acreage is reported from Cedar, Polk and Randolph counties, but is too limited to make a record of.

August, 1893.

Summary of returns.	State.....	Northeast...	Northwest..	Southeast....	Southwest..	Central.....
Wheat, condition when harvested.....	71	54	64	84	80	74
Corn, average condition.....	97	97	105	91	91	102
Oats, average condition.....	82	76	80	86	85	80
Buckwheat, acreage compared with 1892.....	94	91	85	97	101	96
Buckwheat, average condition.....	89	94	94	94	88	73
Irish potatoes, average condition.....	96	90	97	93	100	99
Sweet potatoes, average condition.....	93	93	92	94	94	92
Tobacco, average condition.....	87	87	91	77	91	90
Timothy, average condition.....	92	85	95	86	93	94
Clover, product compared with full crop.....	77	73	63	86	80	84
Clover, average quality.....	88	85	85	90	91	87
Pasture, average condition.....	97	99	100	95	94	98
Cotton, average condition.....	85	.....	.....	80	90	....
Sorghum, average condition.....	92	94	98	86	93	90
Apples, average prospect for crop	23	22	22	33	15	22
Peaches, average prospect for crop.....	38	44	54	38	11	44
Grapes, average prospect for crop.....	77	80	93	61	79	70

WHEAT.—Where threshing is in progress the yields per acre vary from 5 to 26 bushels, and from poor shrunken to fine plump berry.

The returns, however, indicate that the crop was, as earlier predicted, generally damaged by the excessive rains of late May and early June.

In the southwest where at harvesting the condition was apparently 100 per cent, when threshed was graded so low as 50 per cent. The heads were not well filled, the grain shrunken, light in weight and much of it discolored, having the appearance of having begun to rot while in the dough state.

At harvest the weather conditions were in most counties first-class, and the wheat was shocked in good condition, but heavy rains since have prevented stacking, and "sprouting in the shock" is reported from the northwest. The price is so low that in some cases the grain was not cut, and in others it will not be threshed, but fed to stock.

CORN.—More promising than for years, and is generally clean. The weather has been favorable, and the growth extraordinary. While this condition is general, there are some counties where the corn is late, foul, small and of bad color. This is the reported condition from the counties of Audrain, Lincoln and Montgomery of the northeast; Gasconade, Mississippi and New Madrid counties of the southeast.

In the southwest the extreme counties of Barry, Greene, Lawrence, McDonald, Newton and Wright report the condition of corn low—due to a local drouth. While the condition in these counties reduces the estimated average condition at this date for the State, the general effect on the total product of the State would be slight.

OATS.—The promised abundant crop of oats of excellent quality has been cut short by rust striking many fields about a week before harvest.

A decline of 21 points from the estimate of a month ago does not more than express the damage, even while the fields uninjured by the rust give a large yield of a very superior quality.

IRISH POTATOES.—In condition are very similar to corn. The great bulk of the State reports the very finest, away above the average, while the average estimated percentage for the State is lowered by bad prevailing local conditions over limited areas. The beetle, rust and drouth have affected this staple, and it is not encouraging to learn from the reports that many farmers let the bugs and rust take their potatoes, when both can be successfully combated by the use of Bordeaux mixture and Paris green as a spray. The potatoes from less than one-fourth acre of potatoes would pay the entire cost of a spraying outfit and the material to use, and then the machine would be on hand for next year.

SWEET POTATOES.—Promise an average crop.

TOBACCO.—While more promising than at this date last year, is yet below the average, and the condition in the southeast, particularly, not good. The very low percentage condition of that section is, however, due to a few counties.

HAY.—"Timothy a splendid heavy crop" is reported from some sections, but the crop has been disappointing in many counties, the yield being too much mixed with red-top, and in some sections the seed ruined by the native grasshopper. The product of clover was reduced by being frozen out, and the quality of the old crop is not of the best, but that of the new is excellent where the native hoppers and a clover worm have done no damage. The prospect for a crop of seed is not so good, on account of the grasshoppers.

PASTURE.—The majority of the correspondents report pasture in excellent condition; a very few complaints of shortness due to drouth, but the general condition for the State is good.

COTTON.—The counties of Butler, Howell, New Madrid and Ripley of the southeast and Ozark of the southwest only report cotton grown for commercial purposes, and not from one is the condition reported prime for this date.

SORGHUM.—Is about an average. A large acreage is not generally grown, but on the majority of farms, the patch, the product only for home consumption.

FRUIT.—No marked change in condition; many reports of a "total failure" of apples, but as that condition was anticipated, the average percentage condition for the State is not materially affected.

Rot of the grape is reported, but is not general, and the prospect yet fair.

September, 1893.

Summary of reports.	State.....	Northeast...	Northwest..	Central.....	Southeast...	Southwest..
Wheat, acreage harvested, compared with '92	88	75	82	80	97	100
average yield per acre in bushels.....	10½	10	11	9	11	11
quality of grain (100 represents high grade).	72	57	73	70	82	76
Corn, condition	91	80	112	97	73	90
Oats, yield.....	83	70	75	90	90	86
quality.....	82	82	70	85	90	84
Buckwheat, condition	84	90	97	76	80	73

Summary of report.	State.....	Northeast...	Northwest..	Central	Southeast...	Southwest..
Potatoes, Irish	91	82	92	96	84	94
sweet	83	87	88	68	80	82
Tobacco, condition	85	90	91	83	87	66
Cotton, condition	84	.....	.....	.. ...	76	91
Sorghum, condition	92	91	101	94	80	87
Apples, condition	23	20	21	18	35	15
Peaches	35	43	54	32	38	10
Grapes	73	77	90	72	54	71
Clover	77	80	67	72	78	87
acreage	85	87	77	84	97	86
Horses, number, compared with 1892	100	100	102	95	100	101
condition	99	99	100	98	98	98
average price per head	52	62	46	56	65	52
Mules, number, compared with 1892	100	95	99	96	98	99
condition	101	99	101	102	99	99
average price	69	72	60	71	74	69
Cattle, number, compared with 1892	93	94	82	94	95	93
condition	99	94	102	100	95	98
price 3-year steers on grass	25	30	31.50	27	16.50	21
price 2-year steers on grass	18	23	23	19	11	15.63
price 1-year steers on grass	11.50	15	15.50	11	6.50	10
number grain-fed, compared with 1892	81	81	87	80	73	82
Milch cows, number, compared with 1892	93	90	94	94	97	91
Sheep, number, compared with 1892	96	96	101	94	92	95
condition	99	99	101	100	97	99
average price per head	2.45	2.68	2.80	2.40	2.00	2.36
weight of fleece for 1893	5.4	6	6.5	4.5	5	5
price per pound for clip of 1893	18	16	15	18	20	19
Hogs, number, compared with 1892	84	88	90	83	79	81
condition	97	98	98	97	94	99
price per pound now	.045	.048	.048	.045	.045	.04

WHEAT.—The threshing of this grain has been practically concluded. There is a decrease in the acreage harvested compared with last year of 12 points; the quality has dropped from 88 to 72, and the yield per acre from 13 to 10½ bushels.

CORN.—This crop is very promising, and shows an increase in the State over last year of 9 points, which is probably a very low estimate. A few counties have been seriously affected by drouth, while others report a phenomenal crop—the northwestern section reaching the extraordinary average of 112 compared with an average crop.

The average in Northeast Missouri is materially reduced by the reports from Audrain, Marion, Montgomery and Monroe, where the crop has been reduced to 50 per cent of an average crop by severe drouth.

Oregon in the Southeast reports about one-fourth crop, and Cape Girardeau about one-half, yet the yield throughout the State will be probably better than that of any season since the phenomenal crop of 1875. A few late pieces could have been benefited by more rain, but the crop is now practically made, and nothing but an early freeze could be expected to prevent the fulfillment of this prediction.

OATS.—While this crop is not so abundant as was expected earlier in the season, yet the yield will be sufficient to supply the demands of the State. The estimated condition one year ago was 65 per cent of an average crop, while this season shows an increase to 83 per cent. A bright grain of fair weight is generally reported, but in a few localities where rust prevailed the grain is very light.

Buckwheat, Irish and sweet potatoes, tobacco, cotton, sorghum and grapes are in good condition and prospect for a fair yield. Cotton, tobacco and buckwheat reported from but few counties.

Apples and peaches are almost a failure, reports giving State 23 per cent of a crop of apples and 35 per cent for peaches. Last season, which was an exceptionally bad fruit year, in September reported apples 40 and peaches 31. Last season the crop in the northern part of the State was poorest, and this year the best. Several counties report the yield for apples as low as 5 per cent, and others say there are absolutely none.

Horses and mules, in number, remain the same as last year, with a prospect for a material decrease in the horse stock by the elimination of the scrub, and the breeding of fewer and better animals for some special purpose.

It may be confidently predicted that the western pony and its progeny, and the all-purpose scrub that is absolutely unsuitable for any thing, have seen their best and last days in Missouri, and are to be

speedily replaced by the massive draft, the speedy, active, intelligent roadster, the sprightly, high-stepping coacher, and the finished saddler.

If the low prices, which made it impossible to produce only the best of its class at a profit, shall accomplish this, they will not have been without a purpose, and the Missouri breeder and farmer will eventually be benefited by having been forced to produce a better animal.

Cattle and milch cows have fallen seven points in number during the last season, caused no doubt by the fact that the very low prices for the last few years rendered the production of beef unprofitable, causing the farmers and breeders to place everything on the market for which they could get an offer. Feeding steers are estimated at 81 per cent of the number fed in 1892. If this condition is general throughout the Mississippi valley, it may be expected that in the near future good cattle may be bred and placed on the market at a profit.

HOGS.—The demand and consequent fair price for fatted hogs throughout the preceding season, the fact that they would command money when the farmers were compelled to have it, and the loss of spring pigs, has reduced the present crop. Many localities report that even the breeding stock has been sold, and that farmers will be unable to supply themselves with hogs as speedily as heretofore. It looks as though prices would be sustained.

It is probable that never in the history of the State have the health and condition of stock been reported better than at present. Correspondents universally report "no disease of an epidemic nature." One or two mention a few cases of hog and chicken cholera, and one a case of black-leg in calves. The pastures are very fine, not a luxuriant growth, but rich and nutritious, and even where drouth prevails stock are in good condition and improving.

To our correspondents who have been so faithful in the past, and who so carefully answered the long list of questions submitted to them last month, we beg to acknowledge the gratitude of this office, and hope they may feel free to call for such publications or information as may be at our disposal, or otherwise command us when we can be of service.

October, 1893.

Summary of reports.	State.....	Northeast...	Northwest..	Central....	Southeast...	Southwest...
Corn, condition compared with average crop..	91	81	110	94	77	90
prospective yield per acre in bushels.....	32	28	45	33	27	32
Buckwheat, condition compared with av. crop.	79	92	81	68	87	79
prospective yield per acre in bushels.....	19	20	13	11	40	19
Potatoes, Irish, yield compared with av. crop.	83	71	80	89	82	83
Potatoes, sweet, yield compared with av. crop.	84	79	88	87	79	84
Tobacco, yield compared with average crop...	87	84	91	89	80	87
quality compared with average crop.....	92	94	91	93	88	92
Cotton, condition compared with average crop.	70	.....	.....	.....	64	70
Flax, average harvested compared with 1892...	55	73	85	51	.....	55
yield compared with average crop.....	54	.....	90	90	.....	54
Pastures, condition compared with av. crop...	70	46	84	73	82	70
Per cent of land in cultivation, including pastures	67	84	89	61	38	67
Per cent of land not now in use that could be cultivated.....	42	47	57	34	49	42
Per cent the enclosed and cultivated land has increased in last 10 years.....	30	25	25	21	42	30
Per cent of swamp or wet land that could be reclaimed by drainage.....	11	04	16	06	25	11
Per cent of land now in timber.....	33	22	19	35	57	33

CORN.—The comparatively high estimates for September are sustained, the average for the State being 91 for that month and 91 for October. The northeast section has improved one point and the southeast four, while the northwest has declined two and central three points, the southwest remaining at September estimate, thus making improvement in two sections equal to decline in others.

BUCKWHEAT.—Reports show a decline of five points from September estimates.

IRISH POTATOES have declined eight points during the last month, but are better than last year. Where not injured by bugs early potatoes are good, and late very light.

SWEET POTATOES have slightly improved in condition.

TOBACCO has made slight improvement since last month in condition and quality.

COTTON reported from but few counties, and condition comparatively low.

FLAX reported from 19 counties, with 55 per cent of acreage reported last year and condition low.

PASTURES have improved since late rains, but previous continued drouth has reduced the percentage at this date.

November, 1893.

Summary of returns.	State.....	Northeast...	Northwest..	Central.....	Southeast...	Southwest..
Corn, yield per acre in bushels.....	32	32	42	31	29	28
Buckwheat, yield per acre in bushels.....	14	13	15	9	18	15
Potatoes, Irish, yield per acre in bushels.....	78	63	77	93	81	76
Tobacco, yield per acre in pounds.....	762	714	905	770	627	795
Cotton, yield per acre in pounds.....	690	.....	.....	.....	631	750
Flax, yield per acre in bushels.....	8	7	11	8	.....	7
Wheat, acreage compared with 1892.....	85	73	89	77	103	87
present condition	87	86	93	74	95	88
Pasturage, present condition	78	69	89	68	85	77
Live-stock, present condition.....	95	94	98	94	94	95
Beef steers, number fed compared with 1892.	84	83	81	84	82	91
Hogs, number fed compared with 1892.....	80	81	82	76	80	78
Mutton sheep, number fed compared with '92	83	84	91	83	75	83

CORN.—This crop is matured, and in many localities is being placed in the crib. The estimated yield per acre for the State remains as it was in October, at 32 bushels per acre. For the northeast it has advanced from 28 bushels to 32 bushels, and southeast 27 bushels to 29 bushels, while the other sections have lost what these have gained

Buckwheat is estimated to yield 14 bushels to the acre, while in October it was placed at 19 bushels.

Tobacco is estimated at 762 pounds per acre, cotton 690 pounds, and flax-seed at 8 bushels.

WHEAT.—Acreage compared with 1892 is placed at 85 per cent, and condition at 87 per cent. In some localities it was too dry to plow and the acreage was materially reduced; and, while seeding was generally late, there was enough rain for germination, and the young shoot looks fairly well.

Pasturage is estimated at 78 per cent, and the condition of livestock at 95 per cent.

Beef cattle have fallen 16 points since 1892. Some localities report large crops of corn and no money to buy cattle.

Hogs are 20 per cent less than in 1892, and are reported as young and small.

COUNTY FAIR ASSOCIATIONS.

ATCHISON.

ROCKPORT, March 20, 1894.

Secretary State Board of Agriculture, Columbia:

SIR—I herewith submit report of the Atchison County A. & M. Society for the year 1893, as required by section 333 of the Missouri Statutes:

Number of members	78	
Indebtedness	$1,750	
ASSETS.		
Land, number of acres 55. Value		$5,500
Buildings—		
Floral hall		1,000
Amphitheater		750
Sixty box stalls		1,200
Sixty box stalls		600
Hog and sheep pens		300
Other improvements		600
Other property		1,000
General condition of property, good.		
EXHIBITS—SPEED RINGS.		
Trotters—		
Total entered, all ages		23
Best time—aged horses		2:30
Pacers—		
Total entered, all ages		6
Best time—aged horses		2:29¼
Runners—		
Total entered, all ages		18
Best time—1 mile		1:52
LIVE-STOCK.		
Draft, coach, roadster and saddle horses		43
Cattle—		
Beef and dairy breeds		20
Hogs—		
All breeds		75
Poultry—		
Large breeds		110
Farm and garden products, number of entries		418
Farm implements, number of entries		9
Ladies' department, number of entries		339
Miscellaneous, number of entries		56
Total number of entries		1,117
Total number premiums paid	543	
Total amount of premiums paid	$2,026 70	
Expenses other than for premiums	675 95	
Total receipts	2,705 65	

REMARKS—Buildings and improvements in excellent shape. Finest natural ground in the State. Very fast half-mile track. Plenty of shade and water. No. 1 large stalls. Speed ring—Money (gold) in beautiful purses hung on the wire.

J. W. YOUNG, Secretary. MILES SICKLER, President.

CENTRAL ATCHISON.

TARKIO, Mo., Sept. 28, 1893.

Secretary State Board of Agriculture, Columbia:

SIR—I herewith submit report of the Central Atchison County A. and M. Society for the year 1893, as required by section 333 of the Missouri Statutes:

Number of members	60	
Indebtedness	$700	
ASSETS.		
Land, number of acres 25. Value		$5,000
Buildings		2,000
General condition of property, fair.		
EXHIBITS—SPEED RINGS.		
Trotters—		
Total entered, all ages		85
Best time—aged horses, 2:24		49
Best time—3 year-old, 2:47½		11
Best time—2-year-old, 3:03½		15
Half mile—best time—1 year old, 1:52		14
Pacers—		
Total entered, all ages		13
Best time—aged horses, 2:22.		
Runners—		
Total entered, all ages		17
Best time—1 mile, 1:51		6
Best time—¾ mile, 1:20		4
Best time—½ mile, :52		7
Total amount of premiums paid, speed ring and otherwise		$2,800
Expenses other than for premiums		700
Total receipts		3,500

J. R. ROBERTSON, Secretary. W. F. RANKIN, President.

ST. JOSEPH FAIR ASSOCIATION.

ST. JOSEPH, MO , Dec. 26, 1893.

Secretary State Board of Agriculture, Columbia:

SIR—I herewith submit report of the St. Joseph Fair Association for the year 1893, as required by section 333 of the Missouri Statutes:

Number of members	300	
Indebtedness	$3,000	
ASSETS.		
Land, number of acres—. Value		$135,000
Buildings		46,000
General condition of property, good.		
EXHIBITS—SPEED RINGS.		
Trotters—		
Total number entered, all ages		387
Best time—aged horses		2:06¾
Best time—3-year-old		2:20
Best time—2-year-old		2:21¼
Best time—1-year-old		2:38¾
Pacers—		
Total number entered, all ages		150
Best time—aged horses		2:06¾
LIVE-STOCK.		
Draft horses		80
Coach horses		10
Roadster horses		30
Saddle horses		40
Cattle—		
Beef breeds		150
Dairy breeds		110
Hogs, all breeds		100
Poultry—		
Large breeds		200
Egg producers		300
Farm and garden products, number of entries		750
implements, number of entries		10
Ladies' department, number of entries		1,100
Miscellaneous		400
Total number of entries		2,260
Total amount of premiums paid	$6,300	
Expenses other than for premiums	12,300	
Total receipts	16,000	

REMARKS.—Rain all week of fair made it a failure.

H. J. KLINE, Secretary.

RICH HILL FAIR ASSOCIATION.

RICH HILL, Dec. 4, 1893.

Secretary State Board of Agriculture, Columbia:

SIR—I herewith submit report of the Rich Hill Fair Association for the year 1893, as required by section 333 of the Missouri Statutes:

Number of members	175	
Indebtedness	$1,267	
ASSETS.		
Land, number of acres 40. Value		$1,600
Buildings—		
Amphitheater, or grand stand		1,000
Main hall		400
Other improvements—fencing and stalls		1,500
General condition of property, good.		
EXHIBITS—SPEED RINGS.		
Trotters—		
Total entered, all ages		53
Best time—aged horses		2:23¼
Best time—2-year-old		2:53
Pacers—		
Total entered, all ages		36
Best time—aged horses		2:19
Best time—3-year-old		2:18½
Best time—1-year-old, ½ mile		1:11½
Runners—		
Total entered, all ages		21
Best time—⅝ mile (time not recorded).		
Best time—¾ mile		1:24½
Best time—½ mile		52½
LIVE-STOCK.		
Horses—		
Draft		20
Coach		16
Roadster		16
Saddle		17
Cattle—		
Beef breeds		10
Dairy breeds		8
Hogs, all breeds		4
Poultry, all kinds		78
Farm and garden products, number of entries		203
Ladies' department, culinary and needle-work		328
Miscellaneous, flowers and fine arts		198
Total number of entries		898
Total number of premiums paid		323
Total amount of premiums paid	$638 75	
Expenses other than for premiums	6,534 49	
Total receipts	6,407 03	

REMARKS.—Our improvements made during the year amounted to about $600. We paid for these, and after all expenses were paid our surplus for the year was $33.79. We have an excellent half-mile track, and expect to make a grand success of our fair next year. Farmers and others are interested, and since our fair was inaugurated, three years ago, there is a noticeable improvement in our live-stock and agricultural products.

W. T. MARSH, Secretary. A. E. BEATY, President.

HAMILTON DISTRICT FAIR ASSOCIATION.

HAMILTON, Mo., Sept. 25, 1893.

Secretary State Board of Agriculture, Columbia:

SIR—I herewith submit report of the Hamilton District Fair for the year 1893, as required by section 333 of the Missouri Statutes:

Number of members (directors)	13	
Indebtedness, nothing.		
ASSETS.		
Land, number of acres, 40.		
Buildings—		
Floral hall, cost		$1,200
Agricultural hall		250
Amphitheater		1,000
Judges' stand and secretary's office		200
Other improvements—Box-stalls, 145		1,400
Other property—Cattle stalls, 30		300
General condition of property, good.		
EXHIBITS—SPEED RINGS.		
Trotters—		
Total entered, all ages		30
Best time—aged horses		2:26¼
Best time—1-year-old		3:58¼
Pacers—		
Total entered, all ages		5
Best time—aged horses		2:15¼
Runners—		
Total entered, all ages		19
Best time—¾ mile		1:20
Best time—½ mile		52½
LIVE-STOCK.		
Draft, coach, saddle and roadster horses, number entries		232
Hogs, all breeds		98
Sheep, mutton and wool breeds		62
Poultry, large breeds and egg producers		89
Farm and garden products		446
Farm implements		23
Ladies' department		312
Miscellaneous		105
Total number of entries		1367
Total amount of premiums paid and speed ring	$3,407 45	
Expenses other than for premiums, about	800 00	
Total receipts, about	3,200 00	

REMARKS.—After paying everything we will have $250 or $300 left.

A. C. MENEFEE, Secretary. JOE AMBROSE, President.

CARROLL.

September 13, 1893.

Secretary State Board of Agriculture, Columbia:

SIR—I herewith submit report of the Carroll County Fair Association for the year 1893, as required by section 333 of the Missouri Statutes:

Number of members	10
Indebtedness, none.	
ASSETS.	
Land, number of acres, 40. Value	$5,000
Buildings—	
Amphitheater, Floral hall, barn, dwelling, sheds, etc.	5,000
General condition of property, good.	
EXHIBITS—SPEED RINGS.	
Trotters—	
Total number entered, all ages	22
Best time—aged horses	2:25
Best time—3-year-old	2:35
Best time—2-year-old	3:31
Pacers—	
Total number entered, all ages	13
Best time—aged horses	2:19¼
Best time—3-year-old	3:34
Runners—	
Total number entered, all ages	16
Best time—1 mile	1:50½
LIVE-STOCK.	
Draft horses	25
Roadster horses	15
Saddle horses	8
Cattle—	
Beef breeds	20
Dairy breeds	4
Hogs, all breeds	32
Sheep—	
Mutton breeds	12
Wool breeds	15
Farm and garden products, number of entries	75
Farm implements	4
Total number of entries	254
Total amount of premiums paid	$3,750
Expenses other than for premiums, not all paid yet.	
Total receipts about	3,500

REMARKS.—We have not as yet paid all our liabilities, as a great many accounts have not been presented yet. To approximate, we are of the opinion that we will fall behind about $250 when all bills are paid.

R. P. QUEEN, Secretary. F. J. WHITE, President.

BELTON FAIR ASSOCIATION.

Number of members	55	
Indebtedness	$2,900	
ASSETS.		
Land, number of acres 34. Value		$3,400
Buildings—		
Amphitheater		1,200
5 horse barns		2,250
Art hall		100
40 cattle stalls		100
20 hog-pens		50
Other improvements—race track		1,200
Other property		250
General condition of property first class. The valuation here given is a low estimate. The land is listed at actual cost.		
EXHIBITS—SPEED RINGS.		
Trotters—		
Total entered, all ages		36
Best time—aged horses		2:39½
Best time—3-minute trot		2:35
Best time—2-year-old		2:54½
Best time—green trot		2:41
Pacers—		
Total entered, all ages		14
Best time—aged horses (2:35 class)		2:32¾
Best time—3-minute pace		2:35
Runners—		
Total entered, all ages		31
Best time—½ mile		:52½
LIVE-STOCK.		
Horses—		
Draft		4
General utility		26
Roadster		25
Saddle		18
Cattle—		
Beef breeds		21
Dairy breeds		4
Hogs—all breeds		28
Sheep—mutton breeds		9
Poultry—egg producers		20
Farm and garden products, number of entries		213
Ladies' department		63
Miscellaneous, specials		93
Total number of entries		605
Total number of premiums paid		306
Total amount of premiums paid	$1,477 05	
Expenses other than for premiums	497 00	
Total receipts	2,574 05	

REMARKS.—The low prices for thoroughbred cattle in all breeds except dairy stock has caused a falling off of interest in exhibition by breeders. The same may be said of draft stock. The fancy road-horse, the saddle-horse and standard-bred trotter or pacer are the favorites among breeders, and have formed the show rings at the fairs this year. Little interest seems to have been manifested heretofore in raising good breeds of poultry, which, however, is changing for the better, and a much better exhibit than formerly will be seen at our fair in '94. The swine industry is always well represented.

R. J. MCNUTT, Secretary. JOHN BALES, President.

SOUTHEASTERN DISTRICT AGRICULTURAL SOCIETY.

CAPE GIRARDEAU, MO., Jan. 1, 1894.

Secretary State Board of Agriculture, Columbia:

SIR—I herewith submit report of the Southeast District Agricultural Society for the year 1893, as required by section 333 of the Missouri Statutes:

Number of members	721	
ASSETS.		
Land, number of acres, 34, value		$1,000
Buildings		3,000
General condition, good.		
EXHIBITS—SPEED RINGS.		
Trotters—		
Total entered, all ages		9
Best time—aged horses		3:00
Pacers—		
Total entered, all ages		9
Best time—aged horses		2:25¾
Runners—		
Total entered, all ages		13
Best time—1 mile		1:50¾
Best time—½ mile		52
LIVE-STOCK.		
Horses—		
Draft		5
Roadster		6
Saddle		13
Cattle, beef breeds		15
Hogs, all breeds		11
Farm and garden products, number of entries		102
Farm implements		8
Ladies' department		475
Total number of entries		1297
Total number premiums paid	$1,684 25	
Expenses other than for premiums	1,650 70	
Total receipts	3,558 55	

E. H. ENGELMANN, Secretary. F. H. KAGE, President.

CHARITON.

KEYTESVILLE, 1893.

Secretary State Board of Agriculture, Columbia:

SIR—I herewith submit report of the Keytesville A. & M. Association for the year 1893, as required by section 333 of the Missouri Statutes:

Number of members	1	
Indebtedness, nothing.		
ASSETS.		
Land, number of acres 40. Value		$1,200
Buildings		1,000
General condition of property, fair.		
EXHIBITS—SPEED RINGS.		
Trotters—		
Total entered, all ages		10
Best time—aged horses		2:28
Pacers—		
Total entered, all ages		5
Best time—aged horses		2:25
Runners—		
Total entered, all ages		20
LIVE-STOCK.		
Draft horses		8
Roadster horses		6
Saddle horses		5
Total number of entries		48
Total number premiums paid		47
Total amount of premiums paid	$1,000	
Expenses other than for premiums	300	
Total receipts	1,200	

M. W. ANDERSON, Secretary. WM. E. HILL, President.

CLARK.

February, 1894.

Secretary Missouri State Board of Agriculture, Columbia:

SIR—I herewith submit report of the Clark County A. & M. Association for the year 1893, as required by section 333 of the Missouri Statutes:

Indebtedness	$600	
ASSETS.		
Land, number of acres, 30. Value		$3,000
Buildings—		
Floral hall		1,000
Stables		1,000
Sheds		1,000
General condition of property, good.		
EXHIBITS—SPEED RINGS.		
Trotters—		
Total entered, all ages		47
Best time—aged horses		2:37
Best time—3-year-old		2:44½
Best time—2-year-old		3:16
Pacers—		
Total entered, all ages		8
Best time—aged horses		2:34
Runners—		
Total entered, all ages		12
Best time—¼ mile		1:21
Best time—½ mile		56
LIVE-STOCK.		
Horses—		
Draft		35
Coach		15
Roadster		20
Saddle		15
Hogs, all breeds		95
Sheep—		
Mutton breeds		35
Wool breeds		50
Poultry, large breeds		75
Farm and garden products, number of entries		45
Farm implements, number of entries		32
Ladies' department, number of entries		300
Total number of entries		717
Total number of premiums paid		1,434
Total amount of premiums paid	$2,007 50	
Expenses other than for premiums	622 42	
Total receipts	2,965 11	

JOSEPH VANDOLAH, Secretary.

CLAY GRANGE FAIR.

CLAY COUNTY, Dec. 18, 1893.

Secretary State Board of Agriculture, Columbia:

SIR—I herewith submit report of the Clay Grange Fair for the year 1893, as required by section 333 of the Missouri Statutes:

Number of members	80	
LIVE-STOCK.		
Draft horses		4
Coach horses		5
Roadster horses		4
Saddle horses		5
Cattle—		
Beef breeds		10
Dairy breeds		4
Hogs, all breeds		20
Poultry—		
Large breeds		14
Egg producers		3
Farm and garden products, number of entries		73
Implements, number of entries		1
Ladies' department, number of entries		87
Miscellaneous, number of entries		24
Total number of entries		254
Total number premiums paid		119
Total amount of premiums paid	$339 50	
Expenses other than for premiums	226 05	
Total receipts	490 55	

REMARKS.—Cash on hand from last year, $75.

The Association owns no property. The citizens of the county give grounds and buildings for our use. Our fair is strictly an agricultural fair. No horse-racing of any kind allowed. Our fair was held at Excelsior Springs.

C. B. COMBS, Secretary. W. E. HARBAUGH, President.

GASCONADE.

HERMANN, Mo., Nov. 11, 1893.

Secretary State Board of Agriculture, Columbia:

SIR—I herewith submit report of the Agricultural Association of Gasconade county for the year 1893, as required by section 333 of the Missouri Statutes:

Number of members	80	
Indebtedness, none.		
ASSETS.		
Land, number of acres 6. 11. Value		$2,000
Buildings—		
Rotunda improved		700
Two exhibitions		600
Secretary's office		150
Ticket office		50
Poultry house		150
Other improvements		400
Other property		100
General condition of property, good.		
LIVE-STOCK.		
Draft horses		7
Horses for all work		11
Cattle, dairy breeds		11
Hogs, all breeds		6
Sheep, wool breeds		1
Poultry—		
Large breeds (trios)		7
Egg producers (trios)		15
Turkeys 3, geese 5, ducks 9, pigeons 5 (total pairs)		22
Farm and garden products, number of entries		177
Fruits and grapes 97, wines 25, total		122
Farm implements, number of entries (displays)		2
Ladies' department, number of entries		109
Miscellaneous		95
Total number of entries		585
Total number premiums paid		182
Total amount of premiums paid	$403 50	
Expenses other than for premiums	737 78	
Total receipts	840 90	
Cash on hand	403 32	

WM. C. BOING, Secretary. HUGO KROPF, President.

GRUNDY.

TRENTON, January 1, 1894.

Secretary State Board of Agriculture, Columbia:

SIR—I herewith submit report for the year 1893, as required by section 333 of the Missouri Statutes:

Number of members	50	
Indebtedness	$2,000	
ASSETS.		
Land, number of acres, 28. Value		$5,600
Buildings—		
Floral hall		500
Amphitheater		500
Judges' stand		100
Stalls		1,200
Other improvements, none.		
Other property, none.		
General condition of property, fairly good.		
EXHIBITS—SPEED RINGS.		
Trotters—		
Total number entered, all ages		13
Best time—aged horses		2 : 37
Pacers—		
Total number entered, all ages		6
Best time—aged horses		2 : 29
Runners—		
Total number entered, all ages		34
Best time—1 mile		1 : 51
Best time—½ mile		0 : 51
LIVE-STOCK.		
Draft horses		12
Grade draft horses		51
Roadster horses		38
Saddle horses		18
Cattle—		
Beef breeds		58
Dairy breeds		6
Hogs, all breeds		41
Sheep, all breeds		50
Farm and garden products, number of entries		125
Ladies' department		275
Miscellaneous		47
Total number of entries		883
Total number of premiums paid		402
Total amount of premiums paid	$1,068 00	
Expenses other than for premiums	913 64	
Total receipts	2,536 15	

REMARKS.—Built a new track during the year at a cost of $2164, also expended $316 for fencing track. Bought five acres ground and cost $100 to fence the same. Have a good track, and the Society seems to be in a fair way to have successful fairs hereafter.

Very respectfully submitted.

PETER H. YAKEY, Secretary. I. W. SMITH, President.

RIDGEWAY FAIR ASSOCIATION.

September 16, 1893.

Secretary State Board of Agriculture, Columbia:

SIR—I herewith submit report of the Ridgeway Fair Association for the year 1893, as required by section 338 of the Missouri Statutes:

Number of members	5	
Indebtedness	$1,000	
ASSETS.		
Land, number of acres, 40, value		$1,200
Buildings—		
Floral hall		400
Amphitheater		200
Judges' stand		100
Eating-house		100
Office and stables, pens, etc		500
Other improvements, fences, etc		100
General condition of property, fair.		
EXHIBITS—SPEED RINGS.		
Trotters—		
Total entered, all ages		6
Best time—3-year-old		2:41
Runners—		
Total entered, all ages		31
Best time—¼ mile		56½
LIVE-STOCK.		
Horses—		
Draft		8
Coach		8
Roadster		6
Saddle		3
Cattle—		
Beef breeds		17
Dairy breeds		5
Hogs, all breeds		17
Sheep, all classes		18
Poultry, egg producers		17
Farm and garden products, number of entries		80
Farm implements		4
Ladies' department		103
Miscellaneous		10
Total number of entries		357
Total number premiums paid		176
Total amount of premiums paid	$904	
Expenses other than for premiums	870	
Total receipts	1,558	

GEO. T. KIRK, Secretary. H. J. HERRING, President.

JOHNSON.

HOLDEN, Mo., Dec. 27, 1893.

Secretary State Board of Agriculture, Columbia:

SIR—I herewith submit report of the Johnson County A. & M. Association for the year 1893, as required by section 333 of the Missouri Statutes:

Number of members	Stockholders.	
Indebtedness	$2,200	
ASSETS.		
Land, number of acres, 40. Value		$3,500
Buildings—		
Art hall		700
Secretary's office		100
Stalls		2,000
Amphitheater		1,000
Hog and sheep-pens		200
Other improvements, track		800
General condition of property, comparatively new, with splendid track.		
EXHIBITS—SPEED RINGS.		
Trotters, total entered, all ages		48
Pacers, total entered, all ages		27
Runners, total entered, all ages		16
LIVE-STOCK.		
Draft horses		11
Horses for all purposes		34
Roadster horses		34
Saddle horses		5
Cattle, beef breeds		12
Hogs, all breeds		25
Sheep—		
Mutton breeds		3
Wool breeds		3
Poultry, large breeds and egg producers		146
Farm and garden products, number of entries		88
Ladies' department, number of entries		86
Total number of entries		447
Total amount of premiums paid	$3,309 50	
Expenses other than for premiums	1,119 73	
Total receipts	4,447 39	

REMARKS.—We had the best meeting this year we have had since the Association was organized.

J. V. MURRAY, Secretary. WM. STEELE, President.

LINCOLN.

Dec. 25, 1893.

Secretary State Board of Agriculture, Columbia:

SIR—I herewith submit report of the Lincoln County Fair for the year 1893, as required by section 333 of the Missouri Statutes:

Number of members	9	
Indebtedness	$700	
ASSETS.		
Land, number of acres, 25. Value		$3,000
Buildings, 4		2,000
General condition of property, very good.		
EXHIBITS—SPEED RINGS.		
Trotters, total number entered, all ages		25
Runners—		
Total entered, all ages		30
LIVE-STOCK.		
Draft horses		40
Roadster horses		35
Saddle horses		15
Cattle, beef breeds		20
Hogs, all breeds		50
Sheep—		
Mutton breeds		25
Wool breeds		25
Poultry—		
Large breeds		10
Egg producers		12
Farm and garden products, number of entries		30
Implements, number of entries		2
Ladies' department, number of entries		500
Total number of entries		819
Total number of premiums paid		300
Total amount of premiums paid	$1,600	
Expenses other than for premiums	1,400	
Total receipts	3,100	

REMARKS.—Our expense account includes $700 used in improving grounds.

We are not a corporation, but run the fair on the guarantee plan: that is, a number of citizens guarantee to pay premiums in full in case the receipts are not sufficient to do so. Our grounds are held in trust for fair purposes and a city park. We find this to be the most successful plan on which to conduct our fair.

J. J. SHAW, Secretary. CHAS. MARTIN, President.

LIVINGSTON.

November 11, 1893.

Secretary State Board of Agriculture, Columbia:

SIR—I herewith submit report of the North Missouri A. and M. Society of Livingston county for the year 1893, as required by section 333 of the Missouri Statutes:

Number of members	158	
Indebtedness	$880	
ASSETS.		
Land, number of acres, 63½. Value		$6,350
Buildings—		
Floral hall		600
Ampitheater		2,000
Stalls and pens		1,500
Office, judges' stand		50
Ladies' building		125
Other improvements		4,000
General condition, first-class.		
EXHIBITS—SPEED RINGS.		
Trotters—		
Total entered, all ages		40
Best time—aged horses		2:21
Pacers—		
Total entered, all ages		9
Best time—aged horses		2:15½
Runners—		
Total entered, all ages		23
Best time—1 mile		1:49
Best time—¾ mile		1:20½
Best time—½ mile		51½
LIVE-STOCK.		
Horses—		
Draft		71
Coach		5
Roadster		39
Saddle		7
Cattle—		
Beef breeds		34
Dairy breeds		9
Hogs, all breeds		81
Sheep, wool breeds		50
Poultry—		
Large breeds		128
Egg producers		51
Farm and garden products, number of entries		100
Ladies' department		298
Miscellaneous		1,241
Total number of entries		1,539
Total premiums paid		510
Total amount of premiums paid	$3,181 75	
Expenses other than for premiums	1,234 92	
Total receipts	4,545 35	

REMARKS.—Our track is said by horsemen to be the best half-mile track in North Missouri, if not in the State.

A. P. SHOUR, Secretary. W. E. GUNBY, President.

NODAWAY VALLEY DISTRICT A. & M. ASSOCIATION.

MAITLAND, Nov. 1, 1893.

Secretary State Board of Agriculture, Columbia:

SIR—I herewith submit report of the Nodaway Valley District Fair for the year 1893, as required by section 333 of the Missouri Statutes:

Number of members		50
Indebtedness		$1,120
ASSETS.		
Land, number of acres, 40. Value		$4,000
Buildings—		
Hall		400
Grand stand		300
Sheds and stables		1,000
Other improvements		500
General condition of property, newly painted and in good shape.		
EXHIBITS—SPEED RINGS.		
Trotters—		
Total entered, all ages		32
Best time—aged horses		2:23
Best time—3-year-old		2:42
Best time—2-year-old		2:49½
Best time—1-year-old		3:01
Pacers—		
Total entered, all ages		10
Best time—aged horses		2:15½
Runners—		
Total entered, all ages		21
Best time—1 mile		1:50
Best time—½ mile		51½
LIVE-STOCK.		
Horses—		
Draft		22
Coach		3
Roadster		19
Saddle		5
Cattle—		
Beef breeds		30
Dairy breeds		7
Hogs, all breeds		28
Sheep, mutton breeds		18
Poultry, large breeds		56
Farm and garden products, number of entries		93
Ladies' department, number of entries		346
Total amount of premiums paid	$2,479 33	
Expenses other than for premiums	829 80	
Total receipts	4,309 13	

REMARKS.—As seen from above, we paid $1000 on our indebtedness. We have since the fair expended about $100 on track work.

E. L. HART, Secretary. D. A. GELVIN, President.

LOUISIANA FAIR ASSOCIATION.

Secretary State Board of Agriculture, Columbia:

SIR—I herewith submit report for the year 1893, as required by section 333 of the Missouri Statutes:

Grounds owned by J. J. McCune.	
Indebtedness, none.	
ASSETS.	
Land, number of acres, 25. Value	$2,000
Buildings and stalls	8,000
General condition of property, good.	
EXHIBITS—SPEED RINGS.	
Trotters—	
Total number entered, all ages	293
Best time—aged horses	2 : 17¼

MOBERLY A. & M. ASSOCIATION.

Secretary State Board of Agriculture, Columbia:

I herewith submit report for 1893, as required by section 333 of the Missouri Statutes:

MOBERLY, Mo., Dec. 25, 1893.

DEAR SIR—I return above, as our Association did not hold a meeting this last year.

Respectfully,

V. M. TEDFORD, Secretary.

PLATTE.

Number of members	65	
Indebtedness, about	$600	
ASSETS.		
Land, number of acres 30. Value		$3,500
Buildings—		
Grand stand		1,200
Floral hall		500
Secretary's office		250
Judges' stand		200
Dining hall		100
Other improvements, 100 box stalls		2,000
Other property		250
Total		8,000
General condition of property, good, comparatively new.		
EXHIBITS—SPEED RINGS.		
Trotters—		
Total entered, all ages		33
Best time, aged horses		2:20
Pacers—		
Total entered, all ages		16
Best time, aged horses		2:19½
Runners—		
Total entered, all ages		24
Best time, 1 mile		1:48
Best time, ¾ mile		1:18½
Best time, ½ mile		:52
LIVE-STOCK.		
Draft horses, entries		19
Harness horses		43
Jacks, jennets and mules		38
Saddle horses		60
Cattle—		
Beef breeds		12
Dairy breeds		23
Hogs, all breeds		23
Sheep, wool breeds		8
Poultry—		
Large breeds		15
Egg producers		25
Farm and garden products, number of entries		128
Ladies' department, number of entries		334
Miscellaneous, number of entries		152
Total number of entries		953
Total number premiums paid		423
Total amount of premiums paid	$1,220 00	
Total amount of purses paid in speed rings	1,650 00	
Total	2,870 00	
Expenses other than for premiums	2,776 60	
Total	5,646 60	
Total receipts	5,918 85	

REMARKS.—Last spring we purchased 10 acres of ground, paying therefor $1000. We borrowed the money to do this, and that $1000 is part of the item "expenses other than premiums." We have about $200 due which we expect to collect in a short time, and expect to apply at least $400 on the indebtedness; that is why we report indebtedness about $600.

WM. FORMAN, Secretary. WM. A. ELGIN, President.

LAWSON DISTRICT FAIR.

September 14, 1893.

Secretary State Board of Agriculture, Columbia:

SIR—I herewith submit report of the 7th annual fair for the year 1893, as required by section 333 of the Missouri Statutes:

Number of members	16	
Indebtedness, about	$1,500	
ASSETS.		
Land, number of acres, 27.88. Value		$3,000
Buildings—		
Floral hall		500
Stables and amphitheater		500
General condition of property, fair.		
EXHIBITS—SPEED RINGS.		
Trotters—		
Total number entered, all ages		12
Best time—aged horses		2 : 31
Pacers—		
Total number entered, all ages		4
Best time—aged horses		2 : 41¾
Runners—		
Total number entered, all ages		16
Best time—1 mile		1 : 52
Best time—¾ mile		1 : 21
Best time—½ mile		0 : 52
LIVE-STOCK.		
Draft horses		5
Coach horses, all purpose		8
Roadster horses		26
Saddle horses		24
Thoroughbred		8
Mules		6
Hogs, all breeds		7
Poultay, egg producers		5
Farm and garden products, number of entries		31
Ladies' department		345
Miscellaneous		4
Total number of entries		501
Total number premiums paid	194	
Total amount of premiums paid	$1,763 00	
Expenses other than for premiums	922 60	
Total receipts	2,804 75	

A. J. WATKINS, Secretary. S. T. ROBINETT, President.

SCHUYLER.

January 24, 1894.

Secretary State Board of Agriculture, Columbia:

SIR—I herewith submit report of the Schuyler Co. A. and M. Association for the year 1893, as required by section 333 of the Missouri Statutes:

Number of members	63	
Indebtedness	$3,000	
ASSETS.		
Land, number of acres, 48. Value		$3,000
Buildings—		
Stables		500
Art hall		300
Amphitheaters		500
Judges' stand		100
Other improvements, 3 wells		100
General condition of property, good.		
EXHIBITS—SPEED RINGS.		
Trotters—		
Total number entered, all ages		30
Best time—aged horses		2:26¼
Best time—2-year-old		2:55¼
Pacers—		
Total number entered, all ages		20
Best time—aged horses		2:24¼
Runners—		
Total number entered, all ages		10
Best time—½-mile		52
LIVE-STOCK.		
Draft horses		4
Roadster horses		2
Saddle horses		3
Cattle—		
Beef breeds		15
Dairy breeds		12
Hogs, all breeds		32
Sheep, mutton breeds		20
Farm and garden products, number of entries		53
Ladies' department, number of entries		200
Miscellaneous, number of entries		100
Total number of entries		441
Total amount premiums paid	$900	
Expenses other than for premiums	200	
Total receipts	1,025	

E. H. ROBERTS, Secretary. E. A. DUCKWORTH, President.

SULLIVAN.

MILAN, Mo., Sept. 30, 1893.

Secretary State Board of Agriculture, Columbia:

SIR—I herewith submit report of the Sullivan County Agricultural, Mechanical and Stock Growers' Association for the year 1893, as required by section 333 of the Missouri Statutes:

Number of members	42	
Indebtedness	$250	
ASSETS.		
Land, number of acres 35. Value		$1,750
Buildings		750
Other improvements		400
General condition of property, fair.		
EXHIBITS—SPEED RINGS.		
Trotters—		
Total entered, all ages		6
Best time—aged horses		2:25
Runners—		
Total entered, all ages		41
Best time—1 mile		1:46½
Best time—½ mile		:51½
LIVE-STOCK.		
Horses—		
Draft		12
Coach		8
Roadster		6
Saddle		4
Cattle—		
Beef breeds		2
Dairy breeds		20
Hogs, all breeds		6
Sheep, wool breeds		20
Poultry—		
Large breeds		5
Egg producers		6
Farm and garden products, number of entries		50
Farm implements		1
Ladies' department		1
Miscellaneous		30
Total number premiums paid		140
Total amount of premiums paid	$1,450 00	
Expenses other than for premiums	563 00	
Total receipts	2,133 20	

J. S. WATSON, Secretary. JAMES STIRLING, President.

MISCELLANEOUS PAPERS.

THE FARMER'S HORSE.

BY CHARLES L. BUSCH, WASHINGTON, MO.

It is a matter of history that when a horse, for a special purpose, is needed by a nation, he has been produced and used, and when the necessity for that type no longer exists it disappears, and is superseded by one which conforms more nearly to modern requirements. Thus the Galloways of Scotland and the Narragansetts of America, which must have been nearly identical in their characteristics, were created in times when, in either country, the saddle and shank mare formed practically the only means of travel. Each race flourished for perhaps 100 years, and when good roads and consequently wheeled vehicles came into general use it gave place to a type more suited to the times, and was seen no more.

The horse is subjected to many kinds of labor. The treatment he receives in the way of care and culture represents all degrees of management, from the idle and pampered household pet of the wealthy, to the hard-worked and utterly neglected mount of the Indian.

The great diversity of breeding and care, when continued for a series of generations, has the effect of producing many different types of what was originally one race, until we find perhaps as great a variety as is found in the human family, the extremes of which are represented by the ponderous draft horse, 17 hands high and weighing over a ton, and the 35-inch pony which weighs about one-tenth as much.

Nearly every state in the Union has her large breeding establishments in which immense amounts of capital are invested. These plants produce thousands of horses annually, but when all is said and done the farmers are the great breeders of the land. Such being the case, it is in order to inquire which of the many different varieties of horses will best subserve the interest of the farmer, and consequently those of the community at large. The farmer raises the horse: Firstly, for his own use; and secondly, as a source of revenue; consequently the horse that best combines these two qualities is the one that will suit the best. His own work consists in the tillage of the soil by means of modern agricultural implements, in hauling loads weighing from one to two tons, and in ordinary road work, both in harness and under saddle.

The consensus of opinion seems to be in favor of the one that is 16 hands high, or a little more or less, of about 1200 pounds weight, hardy and enduring, handy and active, and that is sweet-tempered and willing. A horse that combines these qualities, or approaches tolerably near to it, may be produced from several different sources. He may be a grade draft horse, may be largely saddle-bred, or he may be a trotter. Each of these classes will produce an efficient farm-horse which will prove very much better than the nondescript or common animals which are in use on the majority of Missouri farms, and when put on the market will find ready sale at remunerative prices.

The particular class that any farmer elects to cultivate should be determined by his individual tastes, ambition and means. Each class has its advantages, some

have disadvantages, and each has its friends and champions, who consider the strains of their choice far superior to any other. The friends of the draft horse claim that he is most profitable for the farmer to raise, because it requires less knowledge to win success in that line than breeding trotting horses. The common farmer need not know the records of the great library of stud books; he need not know the records of the great performers, or the names of the great speed transmitting sires or speed, producing dams, to win success in breeding draft horses.

He need only know what constitutes a correct physical model, select sire and dam of this conformation, mate them together, and the progeny will be like the ancestry, a model draft horse.

The best and principal breeds of draft horses are those imported from Europe, such as the French Draft, Percherons, Belgium, English Shire and Clydesdale horses.

The general farmer who owns a 14 or 1700 draft horse requires no special experience to sell him. It is very easy to ascertain the market value of his horse and demand it for him.

The draft horse is lymphatic in temperament, is easily broken to harness, and submits cheerfully to labor. The farmer has no need of a professional breaker to educate his horse to go in harness, for long years of patient service of ancestors have fixed in him an heredity to submit willingly to the obedience of man, and they are very efficient for farm work; they are in active demand in all large cities, in the mines, in the lumber regions, and in all places where heavy loads are moved by horses. The common farmer who is stocked up with draft horses of suitable weight to meet the demands of the markets can turn them into cash at their real value more quickly than any other class of horses.

The second type to which I would like to call your attention is the saddler, or the "Denmark horse." As a general rule the saddle-bred horse is hardly up to the recognized farm-team size of 16-hand and 1200-pound horse, but many of them approach quite near to it, and withal have so much nerve force and such a development of dense muscle and hard, clean bone, that the farmer who especially fancies such stock can hardly go amiss in cultivating it, for saddle-bred horses can, and frequently do, render very efficient service as farm laborers. In point of style, beauty and elegance of form, the best of them have no superiors, which fact materially enhances their value when placed upon the market.

In disposition they vary, some saddle families showing a decided disinclination to harness work of any kind, while others are as docile, as tractable as it is possible for animals to be; the former are of course to be avoided, but there are many of the latter to be found, and they are the pleasantest kind of horses for personal use. The farmer's boys ride them a few months, when they are ready for the middle man, who puts the finishing touches on their education and ships them to the large cities, where they bring an average good and paying price.

I will not attempt to give an extended history of the great family of the "Denmark Saddle Horse." A brief outline, however, seems to be in place here. The name is applied to the saddle horse of America originated with the illustrious old four-mile race-horse, Denmark, by imported "Hedgeford." This horse was one of the best bred thoroughbreds of his day; out of his loins come the leading families of saddle horses in the world. It was not the old race-horse himself, but his sons who were the originators of the saddle family. But three of the sons of Denmark are known to have been sires of saddle-gaited colts. These were Gaines, Denmark No. 61, Rob Roy No. 62 and Muir's Denmark No. 63, of these the former stands at the head as a great producer.

This horse was bred by Wm. V. Cromwell, of Fayette county, Ky., and foaled in 1851. Through him we have Washington Denmark No. 64, Sumpter Denmark No. 65, and Field's Denmark No. 66 and Diamond Denmark No. 70, all prominent sires; Washington Denmark King William No. 67, Latham Denmark No. 69, Jewell Denmark No. 70, Cromwell No. 73, and others of scarcely less renown. Among the best and most highly appreciated saddle brood mares in the country are such as trace back to old John Dillard. They seem to nick splendidly with the Denmarks. Old John Dillard was bred in Owen county, Ky.

Rules for Entering Saddle Horses in the National Register.

1. Stallions that trace on either sire's or dam's side, direct to foundation, registered stock, or to stock eligible to registry, and go the following gaits, viz: (1) walk, (2) trot, (3) rack, (4) canter, (5) running walk, fox trot or slow pace. Mares or geldings that go the gaits specified above.

2. Any stallion whose sire, grandsire, dam and grandam are strains of blood recognized by this Association.

3. Any stallion that has sired five or more performers under Rule 1.

4. Any mare that has produced two or more performers under Rule 1.

5. Progeny of a standard horse out of a standard mare.

6. The female progeny of a standard horse when out of a mare by a standard horse.

CERTIFICATES.

An applicant for entry under Rules 1, 3 and 4 shall accompany his application with a certificate of two reputable persons as to the gaits and performances claimed.

FEES FOR ENTRIES.

The fee for entry for each animal shall be $1 to mumbers and $2 to non-members, and must accompany the application in all cases.

FALSE OR FRAUDULENT ENTRIES.

If any member of the Association knowingly makes a false or fraudulent statement in order to enter an animal in the Register, he will be expelled from the Association and his entry expunged.

If any one not a member knowingly makes a false or fraudulent statement in order to enter an animal, his entry will be expunged and he will be debarred from entry in the future.

FOUNDATION STOCK.

The following stallions (not now living) will be registered as foundation stock and will be recognized as saddle strains under rule 2:

Denmark, thoroughbred, by Imp. Hedgeford.
Brinker's Drennon, by Davy Crockett.
Sam Booker, by Boyd McNary, thoroughbred.
John Dillard, by Indian Chief.
Tom Hal, Imp. from Canada.
Coleman's Eureka.
Vanmeter's Waxy.
Cabell's Lexington, by Gist's Black Hawk.
Copperbottom, pacer.
Stump the Dealer.
Texas, by Comanche.

Prince Albert, by Frank Wolford.
Peter's Halcorn.
Varnon's Roebuck, a Missouri horse.

I. B. NAIL, Secretary,
514 Third St., Louisvile, Ky.

We now come to the trotting horse, and by that term I mean a standard horse, the horse that is registered or is eligible to registry in the American Trotting Register. The trotting horse is not confined to the track, but is useful on every hand. On the road he is great, on the farm he does the work of the mule, plowing, harrowing and hauling heavy loads. In the cities he pulls the butchers' carts, milk wagons, buggies, carriages, omnibuses and express wagons, and is found indispensable when speed is required. Horses that make trotting-race horses are about one in every hundred, and a man who breeds a common mare to a trotting-bred horse and fails to get a 2:20 performer need not be disappointed, but has some assurance of a nice roadster that will be worth three colts from a scrub horse. A great many people make the mistake and pay from $1000 to $3000 for an imported Coach horse, may he be of the French Coach, German Coach, English Coach, or Cleveland Bay type. If we wish to raise coach horses we can get a great deal better sand cheaper horse by taking a good-sized and well-bred trotter. When put to actual coach work where style, action and speed is considered, in any of our great how rings, we have never seen an imported Coach horse take the blue ribbon over the American Trotter.

One reason why the trotting horse should receive special attention is that he is a purely American production, and the only distinctively national horse we have. He meets the needs and fills the wants of the American people, is up to the times, and is attracting so much attention from all other civilized nations of the world that it will not be long before he is one of our staple exports.

In France, Austria, Germany and England, trotting races have been established as a popular amusement for five or six years, and hardly a month passes without our seeing notices in newspapers of shipment of trotting stock having been made to Europe, and occasionally there is one to South America.

The most approved lines of the trotting horse are the Hambletonian, Mambrino and Clay families, these have produced such sires as Gerge Wilkes, William L. Red Wilkes, Mambrino, Patchen and Electioneer.

In breeding horses we should always have a certain line in view, and breed them for finish, speed, and most important of all, for soundness.

It is a known fact that the pastures of Missouri are full of scrub horses for which there is no sale or demand, and when sold will not pay for one year's keep. Yet there is not a neighborhood in the State that could furnish a car-load of good drivers, saddle or draft animals. If there was such a locality, they would have plenty of buyers and get good prices. Now at the time that horses are very cheap and breeders are ceasing to produce them, it is certainly a good time for some one to commence, and by the time his farm is well stocked up with horses they will sell for good prices. There will never again in the history of this country be a place for the scrub. Therefore I say every horse must be bred for a special purpose. The lines are becoming more distinct every year.

The trotter cannot be used for a saddler, nor a thoroughbred for a draft animal. The man that is now breeding in a line should continue in that line or quit and select another; don't cross-breed. It is too late to attempt to make a turf winner by crossing a standard stallion on a draft mare.

What shall we raise? Well, raise what the market demands most, and this I believe to be horses 16 hands or near it, may it be a good sound Draft horse, a fine high-headed saddler, or a good sharp roadster that will weigh 1000 or 1200 pounds. Any color will always find its admirers, but bay, black or brown and chestnut are colors that are always in demand.

When to sell is another question. I have always sold when some one wanted to buy badly enough to pay my price, whether it be at four months, a year, or whatever age it might be when the customer comes. It has always been my plan to ask for a colt just what I would be willing to give for it were I wanting to buy; and if a customer doubts my judgment on a price to the extent of $5 or such a matter, I generally give him the benefit of the doubt, and he takes the horse. I think it just as well to lose the amount this way as in the cost of food it would take. This matter of selling is where many make a mistake, and really make the breeding of horses an unprofitable business.

IMPROVED STOCK.

BY HON. H. M. VAIL, INDEPENDENCE, MO.

You have invited me to read a paper on breeding and raising thoroughbred stock, and this is to be my text. Of course I have not had a great amount of experience in breeding and raising but one class of blooded stock, viz., Shorthorns; yet I have had more or less observation and experience with other classes, including horses and sheep; but the same laws that govern one are applicable to and govern others. You will permit me to say that I have been a breeder of Shorthorns for more than 23 years, and during much of that time I have been a close student of animal life, observing its laws minutely, and the effect of matter upon matter. Cattle are natural and intelligent chemists, and they seldom make a mistake in mixing their compounds, though not all are equally skilled. Their principal business in life is to convert grass and grains into flesh and milk, and the perpetuation of their species by regeneration. Look upon grass and grain today that cattle are feeding upon, seemingly inanimate, simple, common particles of matter, and in a few hours this same grass and grain is endowed with life; it moves, it vibrates, it hears, it sees, it feels, it has the sensibility of tasts, and it is intelligent organized matter; and all this is brought about by an intelligent chemist, working for the pleasure, strength and perpetuity of the king of beasts—man. Man cannot make flesh, blood and bone out of simple grass or stalk of grain, weeds or herbs, but must call to his aid skilled chemical professors and set them to the work of transformation into suitable compounds for human life. Now, the chemist who will make the best job of this conversion—the cleanest, neatest and most perfect, and in the greatest, quantity with the least consumption of raw material, is the most valuable chemist and the one we all want, and ought to have; and after much observation and experimenting, reflecting men, mathematicians and experts say thoroughbred stock of all kinds are the best skilled and most perfect chemists for all men to employ. In other words, the class of animals used for beef purposes that will make the most beef of the best quality with the least consumption of food, is the class every farmer ought to have; and we say that best class is the blooded stock; that they assimilate food to flesh in much greater quantity and more perfectly than any other class. The food for stock represents man's labor,

his time and his physical capability, and if a third or a fourth of this is wasted on indifferent chemists, he is not only that much the poorer, but the State and Nation also; and if that man must have a sum of money represented by a unit, then he must make up that one-third or fourth by extra labor or deprivation, which either exhausts or may debase.

Capability is generally an inheritance, be it in man or beast; and the longer the line of the same or general capability, the stronger that inheritance becomes which we call potency, or prepotency—the capability of producing themselves quite unerringly every time. To be more specific, there is a class of shorthorns, such as Bates, gathered together, that has a lineage by record and tradition, of near 1000 years, and if good, quite perfect animals all that time, ought they not be prepotent? and if they have had the habit of converting food to flesh all these years, better than any other class, as a rule, should not that habit be very thoroughly fixed by this time, and consequently the more desirable?

The Herefords are good cattle, and have a long line of ancestry recognized, but tradition says they sprang some 600 years ago from Shorthorns, and by degrees bred as a class, for a fixed type. These cattle may be the superior in some localities, and I believe they are, to Shorthorns.

The Galloways are good cattle, and said to be an admixture of the Black ox of Africa and the Shorthorn; they certainly have very few of the characteristics of the Black ox, and they have been bred for so many years on the mountains of Scotland, they have most wonderful hair and very thick hides, suited for a cold climate, like in our Montana. They are not a success in a warm climate, and history says they are not early in maturing, and my observation and a limited experience, prove it to be true.

The Devons are a very old family—as old, if not older, than the Shorthorns. They are a most excellent mountain cattle, resembling in habits and characteristics the elk and deer; if necessity required it, they are superior rustlers, and will live where the elk and deer can, and on poor, scant herbage; they are our best cattle. They seem to do well in Texas, and have the best digestion of all the bovine race in our country; their droppings are quite like that of the elk and deer. I have mentioned these different breeds of cattle because we have them among us, and are considered thoroughbreds, are good cattle, and each breed is better suited to some localities and climates than any other.

But in all rich, heavy grass countries, I consider the Shorthorn much the best; they improve all other classes and breeds to a greater degree than any other thorough breed. Indeed, they have fewer defects in form, when well and properly bred, than other classes—less poor or cheap beef than any other. For instance, a large head, long, large neck, with abundance of dew lap, you would consider, and so would the butcher, cheap beef, or waste offal, and costs just as much to make it as the same number of pounds of loin, sirloin or rump beef. Undue heavy bones, not needed to carry the flesh, are offal, waste; yet they are made at the expense of man's labor; made by consuming food, and not desirable. Sharp or thin crops, light or cat hams, cannot be as profitable or pleasing as full ones, consequently undesirable if you can get better. Are not the Herefords subject to this criticism? Use your own eyes on their heads, necks, hams, etc.; and having these defects, they cannot remedy similar defects in our common breeds, and it is the province and duty of the thoroughbreds to improve defects in the common cattle; and if any class cannot do this, they cannot be as desirable as those which can do so. Still, I have seen some very fine Herefords, and they have their place.

My idea of a good beef animal is one with a rather short head, wide between the eyes; light or small; neck short and small, not over ten inches from jaw-bone to the flesh on the shoulder point, and free from dewlap; shoulders thick and deep, yet not coarse, and well covered with flesh; chops broad; chines full, with fore-ribs and ribs well sprung; loins wide, hips but little wider than the ribs and loins, leaving them free from sharp points or hooks, so that the flesh can be carried from the loins and ribs smoothly and evenly to the rump, and this should be full, free from anything like a valley; ribs long, hams full, legs short and small. Such an animal as I have described has good lung-power, thoroughly oxidizes her food, consequently has good digestion, has pure blood, therefore makes a small, hard, solid bone, capable of carrying a much greater weight than a coarse, porous bone.

This is a description of a good Shorthorn, and what some are and all ought to be, and what most of them would be, if properly bred. Such an animal would be early in maturing, and could be readily fatted at any age; it could be easily made to weigh from 1400 to 1500 pounds, at two or two and one-half years of age, without special forcing. This would save from one to one and one-half years in keeping and feeding, representing not less than $20, and might be easily as much as $30 or more. This is no freak of the imagination, or an untried theory, for I have done it repeatedly in bulls, that will not fatten as easily as steers, as you all know; indeed, I have often made a calf weigh at 12 months 1200 pounds, with no other feed than the nursing of its mother, shelled corn and bran after weaning; and what I have done others can do more readily than I, because they will look after the feeding more closely than I have ever done. But, in order to do this, you must have good cattle, and such as I have described, as a rule. Late maturing cattle are an expensive article for our farmers, yet I fear that they do not realize it; they do not properly note their own waste by keeping such cattle.

HOW TO BREED THOROUGHBREDS.

First, get cows as near the description I have herein given as possible, and especially look well to the thickness as well as the depth of the heart, for a cow with a thin, flat chest, both forelegs standing near together, can never make or produce good breeders, neither is she the kind you can readily improve. Then get you a bull of some prepotent family, as near the description above as may be possible, including a large crest, indicative of muscularity, keeping in mind all the time, "a bull is the half of the herd, hence should always be selected with care, and without regard to price, for the best one is always the cheapest." At this time the very best and most prepotent of the fashionable families are cheap, and any man who can afford to have cattle at all can afford a good bull.

Look well to the pedigree, for a long line of well-bred animals is certainly better than a short one equally well-bred so far as they go. It is not enough to look at three or four of the top crosses when we have a class or classes with from 10 to 20, all equally good as the three or four. Would you consider a man wise or sensible who would select a cow, he having his choice, of only four crosses on top of a good market cow, instead of one of twelve crosses, all equally as good individuals? The pedigree is most important, but it is not all by any means; and a good pedigree should be the author of good animals in every case, barring unfavorable casualties and misfortunes.

When you have selected your type, be it the one afore described, or any other, then stick to that form, and to do this, use quite the same form, being careful not to select an accident, a mere spurt, but a bull from a herd where this type you here choose is usually produced, and has been for many generations, and you will

be reasonably sure of getting something near your standard. But if you should use a bull of a family quite unlike your selection, and then upon his getting a different style of bull, and so on for three or four generations, you will never know what particular form or style you may get, for it may be like the sire or like either of the earlier ancestors, and you will prove yourself a mixer of incongruous matter, wanting in distinctness or perpetuity.

It is unreasonable for any man to expect success in any line of business when he don't know what he wants, or is changed by every freak of fashion, caprice, whim or passing breeze. If a man locks up his reason, his judgment, and takes the dictation or advice of another, he should be very sure that man has wisdom, capable of giving good advice, and that he is honest. We have such men—men who would not mislead others less informed than themselves, for mere self-interest, but I must confess they are not as numerous as we might wish.

It cannot be expected that all men can be equally as well posted in pedigrees or family merits, but it is not pleasing to see men of good judgment in most things, swayed by the boldest ignorance. Ignorance is never modest, but always bold and assertive, and this boldness is often put on by men, conscious of their ignorance, who would be thought wise.

BATES CATTLE.

I am a breeder of Bates cattle—like them best after trying many families—can make better cattle out of them and consider them the most prepotent, but I will confess to you they have been in very many instances outrageously mated, and their life pampered out of them. I would, however, advise any shorthorn man if he must choose between two poor animals, to take the Bates, as well as between two equally good ones; but if he is offered a poor Bates and a good animal of many of our standard families, I say most emphatically, take the latter. Let the poor Bates be improved anew by some men who can afford the losses if any follow.

As I have said, a good pedigree should be followed by a good animal, and if it is not, be cautious how you embrace it, for there is danger.

RAISING THOROUGHBRED STOCK.

In our climate, and our limestone soil, with its rich and abundant herbage, it is an easy and simple operation; and if our breeders fail in producing good stock here it is their own fault; they either overdo or underdo; they feed, house and hamper too much, or starve their stock to death; and the former is quite as bad, if not worse than the latter. To be much in the open air is more necessary for beast than for man; and man is the better for it.

The food taken into the maw, if it remain long undigested, creates a fever and becomes a rank poison; and a free inhalation of oxygen is absolutely necessary for a speedy and perfect digestion of the food taken into the maw, and the quicker this takes place the better for the animal. True, this quick work requires additional food soon after the former is digested for the oxygen to work upon, or else this element will begin at once to cut away the bone and flesh already formed; for it is an ever-consuming fire, burning and digesting suitable material for animal and plant life. I have been in stables of cattle (Shorthorns) where the oxygen was so exhausted by the beasts that you could not see the light of a lamp sixty feet away from you, and I could hardly see the form of an animal twenty feet away; and even the charge of ammonia, freed from oxygen, was fairly stifling. Of course these animals could not eat much—had no occasion to eat, and were poor and in a sickly state—poor because they were out of doors all day with nothing for oxygen to work upon but their own forms.

The severest storms of our winters are not so injurious to our stock as our barns and stables, crowded with cattle, theories to the contrary notwithstanding. But my utterances are based upon nature's law. I speak not only from my knowledge of chemistry, but from humiliating practical experience. Sometimes it gets so cold that cattle will not eat sufficient food out of doors; then, of course, they shrink for a few days; but such times are short in this country. Let your shelter be a wind-break, natural or artificial, and plenty of food, and you will have healthy cattle; and the food is the most important and best protection.

Every law of nature has been violated in breeding Bates cattle, and many other good families, to the shame of our breeders; and I have to plead guilty, myself, to barbarity in keeping some of my cows confined too closely for convenience in breeding time.

Theorists say, "Shelter your cattle and save your hay." But do you really want to save your hay? You cannot make flesh out of air alone, much less the impure air of stables.

The only trouble you will have in out-door breeding is, your cattle will not eat enough, in cold weather, to keep themselves improving, unless tempted by frequent feeding to do so. But many people will inform me that it is cruel to keep animals out in the cold and storms; and I will ask you, or them, which is the most cruel—those who let their stock remain out in the cold all the time, consequently are used to it; or those who crowd their stables with cattle at night, and in the morning find them wet with sweat, and then, while in that condition, with the pores all open, turn them out for the day in the severe cold, maybe storms, until feeding time comes again? Is there any comparison as to the cruelty of the two parties? I cannot see any. The housing at night and then followed by exposure to the cold the following day, is perfectly terrible, and it is a wonder that all don't die. The strongest man cannot stand such imprudence.

But, suppose you keep them up all the time, then you willl exhaust the strength from non-use, thereby injure them; again, the change in the stables is apt to be in the same ratio of heat to cold as out-doors; therefore, arrange to raise your thoroughbreds out of doors, and give plenty to eat, and you will always have healthy stock.

AN END IN BREEDING.

Nothing, or no particular principle in life, seems to be better settled than that in-and-in breeding is all wrong and leads to degeneration and decay. But, are the men who assert a thing to be true, of which they know nothing, the proper teachers of generations, and should any attention be paid to such talk or ideas? Must we believe what even the whole world says is true, if that idea or notion started in ignorance or error?

I here assert that the only way to fix a strong, desirable line of strong animal life is to in-breed.

It is a rule of nature that like begets like, but it is not a rule of nature that that which seems to be alike will always produce like; because, in fact, they are not at all alike. For example: one of two animals is prepotent, the other is a general mixture, a compound of many unlike characteristics; and being thus made up, how could you expect the two to breed alike? All breeders love uniformity, but can you obtain this by changing your bulls from one family of Shorthorns to another as often as you change bulls? How can you expect to maintain the type you started with by this kind of mixing? The deer, the wild animals, the birds, and in man the Jews, seldom mix their blood, and there is no degenerating; but we see in them that like does beget like, perfectly, as a rule.

Ought we not to learn by these examples how to fix a type, and can there be any other way but by breeding in and in? This was the rule of the Millbanks, the elder and younger Collings, Mason, Bates and Booth; and by this system of breeding they gained for themselves and their stock a world-wide reputation; and who has ever done so by general mixing and breeding without a special object or design?

But in breeding "in and in," you must know just what you are doing, the strength and health of your material you are concentrating; for perfect health and strength, early maturity and aptitude of assimilating food to flesh, added to the same qualities again and again, increase them each time and make them the stronger. On the other hand, if you add weakness and defects to weakness and defects, you increase them, also, and make them all the more prominent. Hence the importance of knowing just what you are doing.

I am a believer of "in-and-in breeding" and practice it, yet I never do so indiscriminately, and that I may not concentrate family weaknesses and defects, I keep five or six bulls for my own breeding, and I seldom make a mistake—understanding, as I do, my material.

But this same care is necessary however remote your line of blood may be, for a weak or consumptive bull is liable to almost ruin a whole herd, for the disease will be sure to return in several generations later, and when least expected.

Don't misunderstand me. I say breed in and in just as long as you can add, by so doing, strength and capability to some quality, and no longer; and when in-breeding will not do this you will make a mistake to continue in the use of such bulls on your herd, just the same as you would to continue the use of a bull not in-bred who was spoiling your herd. I need not say degeneracy should not be persisted in under any circumstances.

Every farmer ought to keep a certain number of cattle to consume his roughness, at least that which would otherwise go to waste; and since he must keep the same, why not keep those of the earliest maturity, and which will make the greatest amount of flesh with the least consumption of food?

Again, grain farmers, without cattle, will, after a time, so exhaust their land for grain that it will be quite barren for crops For instance, in a crop of wheat of 25 bu. to the acre, you take from the land 1500 lbs. of grain and full twice that in straw, or 3000 lbs., and some years a greater amount of straw, making for each crop taken off 4500 lbs. You may say a part of this is taken from the atmosphere, and not the land, which is true; but if you burn the wheat and straw, you will have for residuum as much as 5 lbs. of potash, 4 lbs. of soda, the same of lime, more than 2 lbs. of magnesia, the same, or more, of aluminum, a strong trace of iron, near 100 lbs. of silica, also sulphuric and phosphoric acids and chlorine, making in all more than 125 lbs. of the special wheat vitality from an acre of ground; and you must bear in mind these necessary ingredients of wheat are very limited in an acre of soil, and you cannot, for any length of time, take these ingredients from even our rich soil without replacing them; and cattle do this more perfectly than it can be done in any other manner. The use of your land is like the use of your bank: you cannot forever draw from it without putting something back; yet I know of no soil in any country that will bear an equally continuous drain that our soil does, and it is due to the fact that it is largely composed of animal and vegetable matter, based by a limestome rock. Our limestone contains silica, alumina, oxide of iron, phosphate of lime, potash, soda, and animal and other organic matter—quite the same ingredients as are in wheat, straw, etc.; and our soil gets these ingredients that enter into our grain and grass from our limestone rocks by satura-

tion, absorption and evaporation. These, being so abundant in our grain and grasses, are carried into our animal life, giving them a superiority of strength and vigor over less favored sections of our country; and this enables us to raise better and handsomer cattle and horses, men and women than any other country.

Now, in conclusion, allow me to state that you have been acting unwisely for the last four years in turning your attention so much to wheat, and giving the cattle so little thought and attention. For two or more years very few calves have been raised for beef in this county; you have sold your females, ceased to raise and bought your feeders at Kansas City; what is true in your case is true all over the country. The ranchmen in our large breeding countries have been doing their best for several years to get rid of their females, and this year they have had a most wonderful success. Arizona and New Mexico have lost and taken out fully 60 per cent of their females; Texas, the greatest breeding country in the world, has also lost or taken out of her country about the same per cent. The cry has everywhere been, "away with cows; off with their heads;" and off their heads come; steers are what you and everybody else want, and next year and in years to come, where are they to come from? You will say you can't get them in this county, but you can in Kansas and Colorado; there they will tell you "not here, but in Texas;" and in Texas they will inform you, "we are short, we have more grass than cattle," which is the song this very moment. Of course there is quite a supply of one, two and three-year-old steers yet in Texas, but not enough to supply the whole country, as I believe all men will see next year; and by the year after this next, cows that have been sold for $10 will sell for $25. I look in the next few years for higher priced beef than has ever been known in this country, and the regret will be among you farmers that you have not more cows; and I would advise you now to save what you have left; get good thoroughbred bulls and breed good cattle. Even a large number of thoroughbred herds are gone, sent to slaughter, and who is to furnish good bulls?

Is it wise for men to imitate the inoffensive sheep, and yield up a business without a struggle; or, like them, when one starts off in a line, all blindly follow, be it to their ruin? All men want gems, but how can they expect to pick them up from a crowded pathway where everyone is looking for the same thing?

The beef roadway is becoming somewhat deserted, as well as that of thoroughbred stock, and now is the time to enter into these roads and prepare for the rush that will soon come tumbling along them, eager to pick up a hoof or a horn at almost any price; and who so worthy of a rich reward as our wealth-producers, the farmers—the men upon whose shoulders rests the weight of every other business known to the world; and whenever their stalwart forms quiver, stagger and yield, down tumbles every other enterprise in one vast ruin. For the prosperity of the world, and the happiness of all mankind, encourage, cheer, guard around and support the interests of our farmers, who support and save from ruin all others.

HOGS.

BY G. W. PRAISWATER, FILLMORE, MO.

No business can be conducted successfully and profitably without it is done systematically, and then the system must be economical and carefully administered.

When thus managed, and after a series of successful experiments you find it not remunerative, then quit and engage in something else. Be sure, however, that failure is not due to your carelessness or neglect. Remember that as a rule failure is the result of bad management, and not with the business itself.

I have a system of breeding and feeding hogs; have followed it carefully for a number of years, noted the results, and found it profitable.

For breeders I select good, large-boned sows, not too closely built, good size, and such formation as would indicate the production of the best quality of meat for the least money. The sire should be well proportioned in the quarters, deep through the heart, good length, strong bone, and the more vigor and vitality the better.

I breed my sows twice annually, and do not need to keep more than six or eight sows for a 200-acre farm where mixed farming is followed. In order to produce and raise two litters of pigs annually, it is necessary to wean the pigs at from eight to ten weeks old; but I consider this an advantage rather than otherwise, if the pig has been taught, as he should have been, to take slops and other feed while with the sow.

In weaning, I take the sow from the pigs and not the pigs from the sow. I leave the pigs in the same pasture where they have been accustomed to run, the feed troughs just where they were; feed often at first; keep their beds dry, not too warm; do not permit them to have access to heated mulch, as barnyard manure and hogs cannot be kept profitably in the same enclosure. Do not confine pigs or young hogs in a small pen, and if circumstances compel you to do this, you had probably better quit the hog business and try something else. You may confine old hogs, after they have developed bone and muscle, to a small pen; but young hogs, as well as any other young animal, require exercise, as it is a necessity to their full and complete development.

You will also find it essential to assort and grade your hogs, never permitting all sizes to eat and sleep together.

From memoranda carefully kept, I desire to submit the following figures, as they indicate the relative feeding value, for hogs, of corn, and corn after it has passed through cattle:

HOG SALES.

Year.	No. hogs.	Age.	Av. weight.	Price.
1889..	74—fed with cattle	8 months	267 pounds..	$3 75
1890..	80.....	10 "	257 " ..	3 42
1891..	91—fed with cattle	10 "	288 " ..	3 40
1892..	56.....	9 "	236 " ..	4 50
1893..	65—fed with cattle	9 " :...	259 " ..	5 88

From this table it will be observed that hogs fed with and from the droppings of cattle invariably made better weight, age considered, than those fed on corn; and the same results having been obtained from repeated trials, I am convinced that hogs will make meat more rapidly in the cattle-pen than elsewhere, if confined strictly to corn diet.

The average price realized from these sales in the last five years was $4.19 per hundred pounds. The extreme range for this period was $3.05 per hundred in 1891 to $7.00 per hundred in 1893.

I have no particular time for selling, sometimes making three or four sales in a year. When the hogs are ripe and the prices remunerative I let them go.

This is my way of conducting hog-breeding and feeding.

I have found it remunerative, and shall continue in this line until convinced of a better and more profitable one.

BEE-KEEPING FOR FARMERS.

BY REV. EMERSON T. ABBOTT,

President of North American Bee-Keepers' Association.

Bee-keeping has been greatly neglected in many parts of the country, and the result is that farmers generally do not realize its importance, or understand fully the benefits to be derived from keeping a few colonies of bees. Frequently the farmer's acquaintance with bee-culture is confined to the information which he may have gathered from neighbors who have kept a few colonies in box hives, and according to the methods which were practiced before the invention of the modern hive. Such a one knows but little, of course, about the later theories of advanced bee-culture.

Many advocate the theory that bee-keeping should be confined to specialists. It is my opinion, however, that as a specialty bee-keeping is a failure, but it is none the less deserving our attention on this account; for I consider it a branch of agriculture, and as such deserves the attention of every farmer and fruit-grower.

By keeping a few colonies of bees, and giving them a little attention at the time, the farmer can secure for himself and family a delicious, and one of the most healthy, sweets in existence. In fact, it is not always necessary for the farmer himself to give attention to the bees, as there is frequently some boy or girl in the family who has a taste for such things, who could handle the bees equally as successfully as the older members of the family. If the one who cares for the bees gives them the proper attention and develops any special capacity for such work, the bees will not only furnish honey for the family use, but they will be found a source of revenue in the extra honey and wax that they produce.

There is probably nothing kept on a farm that will yield so large a profit on the money invested as a colony of bees. A very reasonable estimate would be the production of 50 pounds of honey by a single colony, and the doubling up of the same by swarming during a season. If we estimate the first cost of a colony of bees to be $5, and the cost of a new hive in which to put the swarm to be $1.25, the increase in net gain would be $3.75, to take no account of the honey. If we estimate the honey at the very low figure of 10 cents a pound, we would have $5 more, which would make $8.75 net gain in a year on an investment of $5. I want to say, however, that while this estimate on a single colony is all right, it would not be safe to estimate this proportion of gain on a hundred colonies. In other

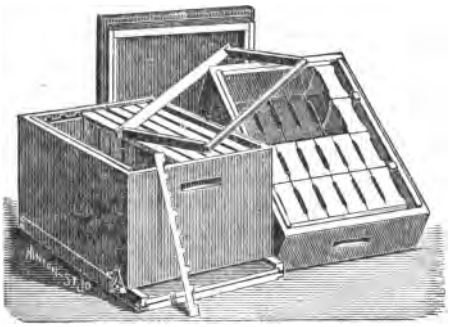
words, I wish to impress upon you the fact that you cannot make a fortune keeping bees, but you can secure for your own use a healthy sweet, learn a deal about the wonders of creation, and at the same time add something to your annual income.

Neither is this all the advantage that may be derived from keeping bees. They bear a certain relation to the production of fruits and berries that greatly increases their importance to farmers and horticulturists. In order to secure perfect fruit of the best quality, complete fertilization of the flower which produces the fruit is necessary. In other words, nature is so organized and it has been so arranged by the Creator, that the union of a male and a female element mast take place in most cases before a new organism can be formed. The male element of flowering plants and trees is found in the pollen of flowers, and the female element in what is called the ovary of the flower. What botanists call the stigma of a flower is generally the gateway of connection between the two necessary elements. As soon as the pollen grains fall upon the stigma, each grain forms what is known as a pollen tube. These tubes grow rapidly downward until they find their way into the ovaries of the flower and form a union with the female cell located therein; and thus each little ovule is rendered fertile, and so growth and activity begin at once. In some cases this pollen dust is carried to the stigma by the wind, but most of our fruits and berries depend upon the honey-bee for this important work. They do this to perfection if the weather is favorable during the time of bloom, and there are plenty of bees in the immediate locality of the trees or berry-bushes. The bees not only secure for the plant fertilization, but they bring about what the stock-raiser knows as cross-fertilization, which is just as important to fruit, if we wish to secure the best results, as it is in stock-raising. The bee, as it goes from flower to flower, carries pollen not only from different flowers from those which are to be fertilized, but from different trees. It visits the flowers many times during the bloom, if the weather is favorable, and thus secures the perfect fertilization of every ovule in the ovary, a thing which is very important, especially in apples. This is a very interesting subject, and I might say more about it, but have not the time or space to do so.

The first thing of importance to those who wish to make a success of bee-keeping, aside from the bees, is the hive in which they are to be kept. I would not advise anyone to keep even a single colony of bees without a modern hive. The hive is an important factor, not because the bees will store more honey in one hive than they will in another, but because the construction of a modern hive is such that it enables one to secure the honey with the least trouble, and also permits the examination of the bees when it is necessary. I wish to emphasize the statement that bees will not store more honey in one hive than they will in another, as many who deal in hives are in the habit of saying to the farmer that if he will buy their hive, his bees will gather more honey than they will in any other hive. Those who make these statements either know nothing about bees and their habits, or else they willfully misrepresent to make a sale. I want to say, also, before I go any further, that there is no patent on anything that is necessary to the construction of a first-class bee-hive.

Perhaps I cannot give an idea of a modern bee-hive in any better way than to present an illustration of one, and briefly describe its parts. I select this one because it is convenient, and from the conviction that it embodies about everything that is necessary for a complete bee-hive for the use of a farmer. I want to

say further before describing the hive, that the simpler a bee-hive is the better it is suited for the purpose for which it is designed.



A Modern Bee-Hive.

By examining our illustration you will see at the left a large box which we call the body, or brood chamber. This is to be filled with frames which run lengthwise. On the top may be seen one of these frames, which has been removed from the hive. The top of the frame is called the top-bar, and in this hive the top-bar is triangular, or three-cornered, as shown in the illustration. This is not absolutely necessary, but is convenient where foundation is not used. The pieces that make the two ends are called end-bars. The lower part of the frame is called the bottom-bar. In the hive illustrated the frames hang on a metal rabbet, one of which is seen leaning against the body of the hive. This spaces the frames the proper distance apart, which is one-fourth inch. It also prevents the bees from sticking the frames to the hive, and it is so arranged that there is one-fourth inch space under each frame at the end. This, also, is not necessary, but convenient. It is also convenient to have a movable bottom, as it enables one to clean out the hive in the spring, or to enlarge the entrance during warm weather.

The box sitting to the right of the body is called a half-story, or super. The little boxes sitting inside of the super are square and they are called sections, or section-boxes. You will notice a place in the super where the sections have been removed, showing the bottom of the super, which is made of slats cut out to fit the bottom of the sections, and these bottom-rests are called pattern-slats.

Back of the other parts will be seen the lid which will fit on the body of the hive, or on the super when it is in place on the body. The sections, when in place on the super, may be covered by a cloth or what is known as a honey-board, neither of which is shown in the illustration.

The distance between the frames and the super, when it is in place, is one-fourth inch. This is also the distance between the frames and the distance between the end-bars and the body of the hive as well.

The top-bar of the frame is 18¾ inches long, and 1⅛ wide. The bottom-bar is 17¼ inches long, and may be as wide as the end bar, but in the illustration it is only ½ inch wide. When the frames are all in place and the super on top of the body, with the cover on this, we have what is called a story and a half hanging frame hive. Such hives are sold extensively by dealers through the country in what is called the "knock-down;" that is, each piece is cut complete and perfect, ready to nail together to make the hive. Sections are generally sold separately in the flat. This or a similar hive made out of good lumber should not cost to exceed $1.00 for all the parts cut ready to nail, and in some localities they can be had for even less than that. One can see at a glance the advantage of such a hive over the old box hive, or "gum," that is yet found in many parts of the country.

Having settled the question of a hive and secured one good colony of bees, that is enough to begin with, the next thing to do is to fix on a location for them. The hive should be placed near the ground on some kind of support, and four bricks will make a very good rest for it. It should front to the south, or as near that as possible, and it is better to have it slope slightly toward the entrance. The

weeds and grass should be kept cut down in front of the hive, that the flight of the bees may not be obstructed as they come and go. It is also a good idea to lay a board a foot or more wide in front of the hive, so it will come up even with the entrance, for the bees to light on.

Do not send off a long way in order to get bees with a high-sounding name, but buy the best bees you can near home. If you cannot make a success with the ordinary bee found near you, you cannot do it with any bees. It is time enough to improve the stock when you have learned fully how to handle them.

TOOLS.

The next thing to be considered is the tools you will need. Let me say first that it will not be necessary for you to buy everything you see advertised for sale in the catalogue of dealers in this class of goods, in order to make a success of the bee business. You will need but few tools, and many that you will find advertised are not only not necessary to success, but may prove a positive hindrance. Above everything else, give the man who has a patent bee-hive with moth-traps, etc. the go-by. However, there are some things that you need and must have, in order to successfully handle a colony of bees. The first tool of importance which I will mention is a smoker. Our illustration will give you a very good idea of this without any description. There are other styles of smokers, but this illustration will give you a general idea of all of them. Smokers sell from 50 cts. to $2 each, but the cheaper ones will answer every purpose for the beginner. Cotton rags knotted together, or rotten wood, make very good fuel for any of them. Do not smoke the bees too much, but just enough to let them know that you are master and they must behave themselves. You will also need a bee veil, if you do not enjoy being stung in the face. There are people who are so very smart that they never need anything of this kind, but I have never found any pleasure in being stung, especially about the eyes; therefore I advise every one who has to handle bees to secure a good bee veil. They cost from 50 cts. to 75 cts., according to quality. A good, strong screw-driver will also be found very convenient for lifting out the frames, prying up the lid and doing many other things about the hive.

Smoker.

These are about all the tools anyone will need, unless it be a swarming box, which is simply a small, light box, open at the top and bored full of small holes on all four sides. There should be some way fixed on one side to fasten the pole to it. When the swarm settles upon a limb, elevate the box until it is directly under and near the cluster. Then, by giving the box a quick movement upward, the bees can all be jarred off from the limb, when they will settle on and in the box, if it is held perfectly still for a few moments. After the bees are in the box, it can be carefully lowered and carried almost any distance you may desire, to the hive. By removing the pole, turning the box upside down and giving it a little jar, the bees can be dumped down in front of the hive which is to be their future home. By rapping gently on the hive and waiting a few moments, the bees will soon begin to go in. If they do not move fast enough to suit you, or you are in a hurry, you can give them a few puffs of smoke from your smoker, which will greatly increase their speed. One should always keep the smoker lighted and ready for business while handling the bees. The hive in which the swarm is to be placed should be put on the old stand, and the old hive moved to some other location in the yard.

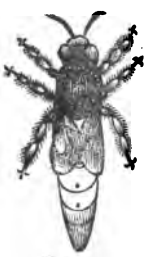
Another tool which will be found very convenient when it becomes necessary to remove the surplus honey, is called a bee escape. The illustration will give an idea of this also. It may be had of any dealer in bee supplies, fitted into a board ready for use for 35 cents. Full instructions as to how to use this tool generally accompany it.

Bee Escape.

You will see from what I have said above that it does not take a fortune to begin keeping bees.

KINDS OF BEES IN A HIVE.

In order to help those who may not be so fortunate as to see inside of a bee-hive, I will say that during the summer there are generally three kinds of bees found in every hive—the queen, workers and drones. The queen, or mother bee, which is a better name for her, as she has nothing to do with ruling the hive, lays the eggs that produce all the bees in the colony. The queen is matured in a cell much larger than any of the others, and her cell is generally perpendicular instead of horizontal. From the time she is hatched she is fed what is called royal jelly and receives extra care. This hastens and changes her development, and causes her to mature and come out of the cell a perfect queen in about 16 days. The queen lays eggs very rapidly during the busy season. It has been estimated that she lays from 3000 to 5000 eggs in a single day.



Queen.

The worker bees, which are undeveloped females, issue from the cells in twenty-one days, and make up the larger part of a colony of bees. There are 50,000 or more of them in a good strong colony. They build the combs out of wax, which is secreted by six glands, located in the lower part of the abdomen. This wax is secreted by the glands about the same as is milk in a cow's bag. The workers gather all the honey, feed the young, protect the hive from robbers, and, in fact, do all of the work that is done by the colony.

Worker.

Drone.

The drones are the male bees, which issue from the cell about the 24th day, and whose chief end is to fecundate the queen, which occurs only once in her lifetime. They are the largest bees in the hive, and when they fly they make a loud, buzzing noise, and are the terror of people who are not acquainted with the economy of the bee-hive. They have no stings, however, and are generally considered to be of no utility except that mentioned above, but I am not so sure of this.

It is the old queen and old bees that go out with the swarm when the hive is so full of brood and honey that they have no more chance to work. This is the reason why it is best to place the new swarm on the old stand, as it prevents second or after-swarms, by throwing all of the old bees into the new colony, and rendering the colony from which the swarm issued so weak that they have no disposition to swarm any more. One good swarm from a colony in a season is sufficient, as second swarms are apt to be small, and they will therefore fail to gather enough honey to carry them through the winter.

I have given only a few hints on the subject of bee-keeping, as it would require one to write a book in order to explain the industry fully. Those who are anxious for more information on the subject may get it from books treating on the subject of bee-culture. I would recommend Langstroth on the Honey-Bee, re-

vised, which can be had of any dealer in bee-keepers' supplies. It costs $1.40, postpaid. There are numbers of other good books and papers which are devoted to this subject exclusively, but I have not the space to mention them here.

COUNTRY ROADS.

BY DR. S. B. ROWE, ROLLA, MO.

From the earliest recollection of the oldest inhabitants of our county, there has been no material change in the system of working the roads, or manner of constructing them, since they were children. The citizens are warned out to work so many days each year—on an average three days. All persons liable to do military duty are called upon. They generally respond. They fill up the gullies with clay, if they are not too deep, otherwise they cut a new road through the trees around the gullies, leaving the stumps of variable height—from three to eighteen inches. The work is generally performed in the autumn, just before the equinoctial storms, during which the gullies have the new deposit of clay washed out of them, and the newly constructed sections of road-bed made of clay are rendered a quagmire and remain so during the following winter, or are churned full of pitfalls, and in this condition frozen, rendering them almost impassable on account of their rough and dangerous condition. Following the breaking-up of winter the spring equinox comes on and the road built the previous fall—generally twice as wide as it need be, and lowest in the center from the winter's travel—forms a veritable flume for the rushing torrents, and when at last balmy summer comes, so associated in our minds with pleasant drives, and when the crop of the farmer has to be hauled to market, he will be fortunate if his wagon does not become upset or broken down. These things are familiar to you all, and it is needless to enlarge the illustration.

SOME OF THE EVIL RESULTS.

I have been at some pains to procure some local statistics. How near correct they are you may determine by investigating, as I have done.

In a radius of 10 miles around Rolla, embracing on an average all the territory tributary in trade to Rolla, there is expended annually in labor on the roads 1200 days' labor at $1 per day per hand, $1200; 200 days' labor with team at $2 per day, $400. Damage to rolling-stock above what would be the case with good roads, $2000; damage to teams for similar reasons, $1000; damage to general business interests of the community by an average of one-sixth of a year's stand-still in business, at least $5000. Total actual loss, $9600.

This loss is as clear as though that much value in property was destroyed by fire without insurance. It is a continual annual drain on the resources of the community, and I might add to the sum one or two more thousand dollars in time consumed, needlessly traveling over such roads. Besides all this, there is a hypothetical loss to every person who owns an acre of land or a town lot. Who will deny that a farm is worth from 25 to 100 per cent more by having a good road running from it to the market town, than it would be with a road barely passable any of the time and practically impassable one-fourth of the time. There is nothing that will so attract the eye of emigrants who are looking for improved homes, as that of good roads leading to and from them. We may safely say that there is an annual loss to the people of the whole of Phelps county, in labor as at present expended on roads, in damage to rolling-stock and teams, in time lost in traveling

over difficult roads, in loss to the general business interests of the community by having roads that can not be traveled over with comfort any time of the year, aggregating a total of $25,000. The total revenues of the county for State, county, school, contingent and all other purposes, excluding road tax, for year 1891 is about $31,268.00; the road-tax levied by the county is $2732.00, that levied by town corporations approximates $1500, both of which items aggregate $4232.00. Add this to the $25,000 loss in other ways and we have a grand total of road-tax and loss for want of roads, aggregating $29,232.00; or only $2036.00 less than our taxes for State, county, school and all other purposes.

Taking it for granted that the evil of the present system is recognized, the question that first presents itself is, "How may a change be brought about?" We must remember that Phelps county is about 1-120 of the State of Missouri; that a road law must be a general law; that the subject must have a starting point; that if the people of any other part of the State are moving in this matter, we must act in unison with them. If the initial movement is to be in our county we must try and enlist the people of other counties in it. The beginning of all great movements has been by agitation by a few. In the first place let us get the people of our country harmonious on the subject. Let the friends of an improved road law talk the matter up with their neighbors. Show them that it is a question that comes home to them; that it is one that confronts them every day in its practical relations, and is not an abstruse question on which there is room to differ. Taking everything into consideration, our grand old State, Missouri, can boast of more natural resources than any state in the Union. Our interests and industries are more diversified; our river bottoms and prairies yield average abundant crops of cereals. Our uplands average with the land of any other for pasturage and horticulture. We have abundance of wood and water, while underneath us the great chemical laboratory of nature has deposited untold wealth of coal and valuable minerals; and yet, with all our natural advantages, we are behind many of our sister states in the matter of country roads.

Nothing contributes so much to the prosperity and happiness of a rural community (by which I would include in this instance not only those who live on farms, but those who live in country towns as well) as good country roads, such as can be traveled with comfort at any season of the year. We have, at least in this part of the State, material as handy and of as good quality for road-building as can be found anywhere in the world. Cropping out every few rods is a bed of hard-pan, which only requires to be taken out and properly distributed to make an excellent road-bed. At certain seasons of the year, just after the freezing of winter, it can be worked with ease. Every few miles along most of our roads we have inexhaustible beds of gravel, which is the same hard-pan before alluded to divested of its clay. Either of these makes a road-bed much more lasting than macadam, because the individual pebbles are harder, and will wear much longer. In some communities, material such as we have ready at hand is hauled many miles, often by rail, for making roads.

It may not be amiss for me to express my ideas as to how we can accomplish this much-desired end. After we shall have procured a road law empowering the several counties to make liberal provisions for road-building, let the county issue its bonds for road-building purposes, not all at once, but so many every year as it may be deemed necessary to expend for the next succeeding year. Have these bonds run a liberal length of time. Make provision to meet the interest on them as it accrues, and leave to a succeeding generation to meet the principal. We shall do no wrong to the generation that comes after us by leaving them a debt of this

character, when they have something to show for it in the shape of good roads and the enhanced value of their farms and homes as a result.

Have all road-building done by contract under the direction of a competent engineer. Begin by making a permanent road where it is most needed. Where the natural road-bed is fairly good at all seasons, leave it undisturbed. Have the road-bed not wider than to allow two wagons loaded with hay to pass each other, say 18 feet, and have it rounded in center. Have the upper side of all road-beds drained, and carry the drains down to where there is absolute necessity for a culvert or bridge or a gravel ford. Have these drains wide enough and deep enough to convey all the water that will ever have to be conveyed by them to prevent its running over and tearing up the road-bed. Have good roads radiating from the principal market towns in the county, and intersecting and inosculating with each other.

Now as to the manner of levying the road-tax: let the town property and farms lying within a mile of town and immediately on the line of a good road, represent a unit as to benefit derived from such roads, and be taxed accordingly; and farms lying further from town and on the roads, be taxed in a decreasing ratio; while farms lying remote from towns but at the same time quite a distance from a good road, should be taxed still less, and in this way the burden would be distributed according to advantages derived.

COUNTING THE COST.

It is perfectly natural that the average enterprising American, before embarking in an undertaking rsquiring the expenditure of money, shall count the cost. It is one of the characteristics of us as a people. So in the matter of country roads, whether we propose to create a debt with the expectation of paying it in our lifetime, or leaving it a heritage to the generation that will follow us, we will naturally count the cost.

It is believed that a bonded debt, when that debt shall be honestly contracted and the proceeds of such bonds honestly and judiciously expended in the improvement of our roads, that such bonded debt in these days, when capital is looking for safe and permanent investments, can be floated for 4, or at most 5 per cent interest. We shall consider the last figure in making estimates. It is believed by those who have investigated the matter, that aside from bridges required over streams where there is no gravel ford, that the initiatory improvements of our roads can be made for $100 per mile: that is to say, they can be put in such condition with that amount of expenditure; afterward they can be maintained and improved so that at the end of two years they will be permanent, good road-beds, at a cost of $25 a year. Therefore the cost of a mile of good road at the end of ten years, including the interest up to that time at 5 per cent, will be $431. Suppose then at the end of ten years we shall have 500 miles of good roads in our county, which would give five roads radiating from each important market town in the county to the county border, or to an intersection with roads leading from each other; the total cost of those roads up to that time, including interest, would be $215,500. The interest expense to carry such a debt would be $10,775. There is an actual loss to the people of the county by the present system, as shown heretofore in this paper, of $25,000. Difference in favor of the debt for the purpose of building good roads, $14,225. In addition to this we may add 50 per cent to the enhanced value of every foot of real estate in the county. So it can easily be seen that this interest account can be met, and a sinking fund that in a reasonable time will wipe out the debt can be also met, and leave the people of the county each year with several thousand dollars in their pockets aside from the increase in value of their property.

The first thing that the average tax-payer will ask is this: How much will it add to my tax? Well, supposing that the amount at present levied for road purposes shall be continued for the purpose of constructing and maintaining bridges and culverts and supplying road-grading implements. The present total amount of taxes levied in our county for state, county, road, school, pauper and contingent expense amounts to $34,000. To this add the $10,775 interest on road bonds required, and we have $44,775. The man who now pays $10 will then pay $13.24, or will pay that amount at the end of 10 years. As a matter of fact, taking it for granted that bonds will be issued and begin bearing interest only as the work on roads progresses, the $10 man will not have to pay exceeding $1 more the first year, and will pay an increasing tax year by year until it reaches $13.24 in 10 years, but in the meantime he will be exempt from the three days' work at present required, and will be reaping the benefits of good roads. There is an economical side to this question, however, which has not heretofore been alluded to. It is this: The amount expended on our roads need not be a drain on our resources at all, even in the first instance. This expenditure may be managed so that, other things being equal, the people of our county may get the whole benefit of it. The contracts for work may be let to farmers and others in our county, and the money will stay here. Anything that increases the value of my neighbor's property, to a certain extent increases that of mine. In matters of importance like this, we should not let a narrow spirit of neighborhood envy influence us.

Another point that I have only incidentally alluded to is the justice of having the burden of a general road-tax borne by the people who live in towns, as well as by those who live on farms. A town is the crystalization of the resources of the surrounding country that makes the town, and therefore the people who enjoy the many conveniences and comforts and profits of trade by living and doing business in the towns, should bear their part of the burdens of the arteries of their trade, conveniences and comforts, the surrounding country roads. Let the people who live in towns bear the additional burden of keeping their streets in repair, or let them go unrepaired if they find it more to their advantage.

IN CONCLUSION.

We are now approaching and in a few years will be brought face to face with the fact that there will be no West practically, and the young men of our State will be unable to follow the advice of that sage, Horace Greeley, to go west and grow up with the country.

Is it not a serious question that many of you have considered, what is to be the future of the young men of our country, especially of those who live and are being raised on farms? The public domain is being rapidly taken up. Not one in four can now procure a desirable homestead. Who can have forgotten that spectacle of a few years ago when an army of home-seekers swarmed upon the borders of Oklahoma, and when the word was given, moved in, and, as it were, created a state in a day.

The system of farming on a large scale, if we would not have our people divided into two classes, those of landlords and serfs, must give place to a system of small farms, highly cultivated and easily accessible to market, so that the man who has several sons coming on, and a quarter section of land, will not give the boys the alternative of staying on the old homestead, eking out a precarious subsistence by farming in the old way, or starting them out in the world to fill an already over-full army of unemployed labor. Under the new system that is bound to come he will educate his boys to cultivate well a few acres, and his quarter section will

be divided and subdivided into small, well-cultivated and thrifty farms. We cannot contemplate the rapid augmentation of population in this country without considering the necessity of a change of system. It may be slow in coming, but it is inevitable when people shall have to live closer together on smaller tracts of land and procure a subsistence thereon. To be prepared for and to anticipate that condition of affairs, the initial step for us to take is by a system of good country roads, make a market of convenient access for them, and a ready and pleasant means of intercommunication between neighborhoods.

GOOD ROADS—WHY, WHERE, WHEN AND HOW GET THEM.

PAPER BY LEVI CHUBBUCK,

Read to the Chillicothe (Mo.) Farmers' Institute.

As to why we should have good roads, I can do no better at the outset than to quote the reasons given by Gov. Flower, of New York. He says:

"I regard the movement for good roads as one of the most important of social reforms. It has in it great material benefit to the people generally, and to the agricultural interests of the country particularly. In the East, especially, we have reached a stage of development where a net-work of smooth highways is essential to our prosperity and growth. Our cities and villages must be brought into closer contact with the farms. In many sections the limit of communication by railway and canal has been reached, and dependence must be now upon good roads. To the residents of the farms, to the merchants in the towns, to the canals, to the railroads, to the large army of employes, to the consumers in the cities—in short, to all interests and citizens, the close communication of farm and city is most desirable for business and commercial reasons alone. Good, substantial roads leading out to the rural towns from the principal business community in each county cannot help stimulating business in that community and developing the country round about it. But beyond all this, they are as advantageous in elevating the social and intellectual life of the rural population as they are in improving its material condition."

Will anyone dispute a single assertion made in the foregoing? I believe no other one factor is doing so much to hinder the intellectual, social and material advancement of the farmers of this land as do the poor wagon roads. Indeed, I question if all other hindering causes combined are so much an obstacle to advancement as this one which connects the farm homes with the world—a connection, however, which at no time permits that freedom of intercourse that should prevail, and at times necessitating an almost complete suspension. Human beings only make progress as they mingle with one another, interchanging ideas, and gaining stimulus by rivalry.

As to why we should have good roads, so as to enable farmers to get to and from market places easily and quickly, and at all times of the year, a volume might be written, and yet the truthfulness of the bare proposition that farmers need and must have good roads to enable them to properly conduct their business is so apparent that it scarcely needs further arguing. And not only is this true of the farmer's business, but a large part of the business of the country is well or ill affected by the good or bad condition of wagon roads. Railroads, the wonderful development of which in this country is one of the prime causes for the non-im-

provement of our wagon roads, are quite dependent on these same wagon roads. A very large part of their business consists in transporting freight which has to be hauled to or from their stations by wagon.

Any railroad manager will tell you, as some have told me, that when the country roads are impassable for the mud, as is so often the case, that their business falls off greatly in consequence, sometimes coming almost to a stand-still; and of course the business of all country towns is similarly affected. So, too, as regards all social intercourse: when the roads are hub deep with mud, the children can hardly get over them to the school-house; people cannot go to church; singing-schools, spelling-schools, parties, neighborhood visits, meetings of the grange, farmers' institutes, and all meetings of whatever kind, unless it be a funeral, have to be suspended until the roads get better; and even when they get to their average best, passage over them is not what it should be.

WHERE SHOULD ROADS BE MADE?

Would seem to be, on first thought, a superfluous question, for have we not got them already laid out for us, for the most part on section lines? Yes, but I assert and maintain that in adopting sectional lines as the lines on which to lay out our wagon roads was committed the most grievous mistake in all our efforts at road-building—the one which is the hardest to remedy, but which must be radically before we can ever have the system of roads we must have.

Roads having such a grade on which permanent metal surfacing will stand, or such as will permit teams to haul the loads they should, cannot be built in a fairly rolling country without a cost for cutting and filling that the tax-payers will not meet so long as they have any voice in the matter, to say nothing of the disfigurement of the country by a net-work of horrible ditches and embankments spread over her fair face. If horses of flesh and blood are to be made to pull up hill and down one-half of what they might on roads of easier grade, why should not the iron horse that feeds on steam have been made to follow section and other straight lines almost regardless of grade?

I repeat: Until we practically abandon our government line roads and lay them out with reference to the shortest distance, easiest grade and where the best road-bed can be made and maintained, we will not have a system of roads that best serves the interests of all the people. For this part of the work the best civil engineering skill to be had should be called into use.

WHEN TO BUILD ROADS.

The time of the year when the work should be done is a question of considerable practical importance. Under our present system of allowing tax-payers to "work out" their road taxes, the rule is not to let road work interfere with any farm work if this can possibly be avoided, and the result is that the larger part of the work is done too late in the season to permit the soil moved to become settled and firm before the fall rains come. I see no way of successfully avoiding this difficulty except to abandon the system of working out road taxes, and require that the same be paid in money, letting the road work, both new and repairing, by contract, to parties who by continued service will become efficient, and who, making that their business, will have nothing else on their hands to prevent doing the work at the right time.

While there is a best time in which to do certain kinds of work, there is but little time during the year when there is not need of something being done on the roads. Wagon roads need almost as constant supervision and repairing to keep in good condition and save labor as do the railroads. These latter are, as you know,

divided into sections of a few miles, with a foreman and gang of workmen assigned to each, and employed the year round to keep the road-bed and track in repair. A similar system is in vogue in European countries, where they maintain country roads in a perfect condition. To have all of our road work confined to a single brief period is the most costly and absurd system imaginable.

HOW TO GET GOOD ROADS

Is partly answered in the foregoing. Given a proper location, and having the work done at the right time, are two most important steps in road improvement. Methods of road construction should be discussed by civil engineers and others who have been engaged in the actual work. It is folly for one who has not made a study of the science of road-building, either as part of a thorough course of instruction in civil engineering, or practically while engaged in the work, to presume that he knows how to make and repair roads, and the very great prevalence of this folly is largely responsible for the bad condition of our roads. To have roads properly laid out, constructed and maintained, requires engineering skill and training equal to that called for in railroad building, and the quicker we take our road work out of the hands of the class of men usually selected for overseers, as must be under present laws, and employ men educated for the business, the sooner we will have good roads.

There are, however, a few well-established principles in road-making that any one who has given the subject any thought and had his eyes open will have "caught onto," the most important of which is, that water is the great enemy of roads, and that every effort should be made to keep it out of the road-way, both that from below and surface water. The under-draining of soft, spongy places, and constant attention to the surface, preventing the forming of ruts to serve as channels for running water, and depressions to catch and hold water, resulting in mud-holes, would make a wonderful difference in the condition of our roads.

Then, if we will bring into general use the improved road-machines, which are capable of doing more and better work in grading up a road-way than can be done by any other known means, supplement these with as heavy a road-roller as it is possible to get, thus compacting the soil as it is worked into the road-way, and bring about a radical reformation as to width of tire on heavy wagons, allowing none of less than three inches to be used with loads of one ton, we will have good dirt roads for the greater part of the year. Let me observe in passing, that there is no better road made than a dirt road when it is good. But as the population and traffic increase, the need of metal surfacing increases; so all road work, that is, locating and grading, should be done with the fact in mind that the time will come when some sort of permanent surfacing must be applied to at least all of the main roads.

There are other important points for consideration that come under the head of "How to get good roads," which I have neither the time nor the ability to adequately discuss. One is the money problem, and another is the road law best suited to bring about good roads. As to how to get road-improvement funds, I will simply present a suggestion made by Col. A. A. Pope, of Boston. He advocates a succession tax law—that is, a tax on legacies exceeding a certain sum—this to constitute a road fund. Such laws exist in some of the states, and have in England for more than 100 years. In Connecticut, legacies of $1000 and upward, and in Massachusetts $10,000, are taxed.

As to a road law, I believe the one enacted by the Thirty-seventh General Assembly, known as the Local Option law, will, if given a trial by the people, prove useful.

GOOD ROADS.

BY Y. W. POWELL, C. E., CHILLICOTHE, MO.

Mr. Chairman and Gentlemen—The subject assigned me is, perhaps, of as much if not more importance than any other within the scope of my knowledge, from the fact that it is the foundation upon which the great mass of living humanity must move. Hence the parable of the man who built his house upon a rock foundation instead of sand. Just so with our roads. They, too, should be built upon rocks, or some other material of equal solidity.

Agriculture, in all its phases, is being discussed, and is now made a branch of our general government, with all its official paraphernalia to secure proper information and results. While this is right and proper for the government to thus manifest such a deep interest in so important a matter, and while farmers' institutes and agricultural societies are being formed all over this country, perhaps every state in the Union now has its societies for the purpose of discussing and devising ways and means by which better and more perfect systems in every department of agriculture and horticulture may be attained. In my judgment we are leaving undone something of more importance than the manner of harvesting crops, "the weaning of calves," "teaching them to drink skimmed milk," and kindred subjects. I have reference to the transportation problem, or good roads.

Of what avail is it to the inhabitants of New York, Philadelphia, or any of the great eastern cities, with their millions of population, for the rural districts and vast agricultural fields of the west to be overflowing with grain, fruits and vegetables, under our improved systems of agriculture, if the roads are in such condition (as they frequently are) that it is a matter of impossibility to transport the products of the farm by wagon to steamboat landings or railroad stations, to be further transported to the great marts of trade? In my judgment there should be a national bureau created for this specific purpose. I think it is of as much importance as that of agriculture. I regard good roads the very foundation of our civilization. As I have before said, there are three things which mark the civilization of any country: The first of which is good roads, then churches and schools. But of what avail are churches and schools if the roads are in such condition you cannot attend them?

Bad, crooked, meandering roads denote uncouth, indolent, and a semi-civilized condition of the inhabitants.

The wild, untutored Indians had their meandering paths, over which they trod for centuries to their lonely wigwams, and it seems that some people prefer following in their footsteps, and thus "mud" it through life.

Much has been said and written on the subject of road-making, the best material out of which to make good roads, the manner of building and draining them, etc., all of which can be easily accomplished when the proper means are available to pay for the same. This is the great question before our people. 'Tis not the lack of material, or the want of laborers, that causes the great hindrance, but the means to pay for the same. Some have advocated a change in our laws so that a heavier tax can be levied upon the farmers for this specific purpose. To this I am unconditionally opposed. The farmers are already too heavily burdened by taxation. They now donate the land over which all our roads are made, and then they and their posterity eternally pay tax on the same. No, I do not favor such a proposition.

Roads are for all the people, hence a common good to all; and what is for all, does it not follow that all should assist in their construction? Hence there should be a national bureau created for this specific purpose in order to carry out the provisions of the constitution of the United States, which require Congress to provide for the "common defense and general welfare of the people," "to establish post-offices and post-roads," and to "regulate commerce between the several states, foreign nations and the Indian tribes."

Commerce cannot be regulated without the regulation of transportation. For this very purpose Congress has appropriated many millions of dollars of the people's money in the attempted improvement of water transportation, and also donated millions of money, beside many millions of acres of our public domain, for railroad transportation; but not for the last half century has one farthing been appropriated by the general government for the purpose of improving wagon road transportation. But, does some one ask, has the government a right to make such appropriations? I answer, yes; and that the provision of the Constitution of the United States is not complied with unless such appropriations are made. Do I hear some one say, "was there ever such appropriation made?" Yes, millions were appropriated for this purpose in the days of our government's purity. In 1806 there was an appropriation of $1,800,000 made for the construction of the Cumberland road, and year after year appropriations were made for road purposes, and in 1831, under Jackson's administration, there was an appropriation of $1,200,000 made for the further continuance of the Cumberland road through Ohio and Indiana. There were appropriations made for road purposes under Presidents Jefferson, Madison, Monroe, Adams, Jackson and Van Buren, and so continued up to the year 1838, when there had been over $6,000,000 appropriated for the improvement of wagon road transportation. In James Monroe's Fifth Annual message he said Congress had unlimited power to raise money and appropriate the same for the general good, and in his opinion they had a right to appoint a superintendent of the Cumberland road and make appropriations to keep the same in repair, which was done.

Now, if it was constitutional to appropriate money to build roads and keep the same in repair then, it is equally so today, for the constitution, in this particular, remains unchanged. What are the conclusions since 1838, a period of 55 years? Over a half century has passed away without one cent having been appropriated for road purposes, notwithstanding Consulate G. C. Tanner recommended Congress to establish seven leading national roads, and then state roads—all made and maintained by the general government. He says, "I firmly believe that the great hindrance to the farmers of the United States today is the lack of good, substantial roads."

With such a great nation as ours; with mountains of the precious metals out of which to coin money, and with the constitutional provision to coin the same, and to provide for the common defense and general welfare of the people, and also with the decision of the Supreme Court of the United States that bills of credit, or treasury notes, shall be a legal tender, I cannot see why there should be millions of idle men now roaming over the country seeking employment and imploring those who have means to allow them to work for their board. Such is the case in many of our western states today.

When this nation, through some difference of opinion, gets up a family quarrel, it is no trouble to put one and a half or two millions of men in the field, make the money and pay them for the same, together with billions of dollars for running expenses, and yet the nation prosper in the face of such carnage and destruction. I

now ask the question, why cannot this nation, under such constitutional provisions as I have above stated, employ one and a half or two millions of men, and instead of setting them to digging pits, trenches, and throwing up breast-works in order that they may more scientifically and with greater dispatch massacre one another, set them to macadamizing all the roads in the country? Coin the vast amount of bullion now lying in our vaults; reopen the great mining interests of the West that are now closed and causing such distress, and almost starvation. Then should there be a deficiency, substitute legal tender and treasury notes, and pay them well for their labor. Surely this would be the more Christ-like, and make the nation prosper and bloom like the rose, and every fireside throughout the land would be cheers and smiles, instead of tears and mourning.

In conclusion, let us all implore Congress to stop its contemptible harangue, and carry out the provisions of the Constitution, establish a national bureau on public roads, and set the two millions of unemployed laborers to work building roads, which are the very foundation of our civilization.

AGRICULTURAL EDUCATION.

BY LEVI CHUBBUCK.

A paper read before the Chillicothe (Missouri) Farmers' Institute.

MR. CHAIRMAN—I submit this proposition, or rather, let me say, self-evident truth: The perpetuity and prosperity of this nation depend upon the existence of an intelligent and contented agricultural population. This must be the case with a nation existing on popular suffrage and when a large per cent of the voting population live on farms. But not only is the farmer a most important factor in matters pertaining to the ballot-box, he is also a very essential element in the business world. The transporting, working up into new forms, and dealing in farm products, occupies the time and attention of a large share of the remainder of the world's population not engaged in growing these products.

In yet another particular is the farm a most vital element in national conservation, namely, in the production of fresh blood, brains and brawn with which to replenish the towns and cities, and save them from the rot which would inevitably result in a very few generations if dependent on their own recuperative powers.

But, conceding the truthfulness of the proposition, the question I wish to discuss briefly is, how is the agricultural population of this country to be made prosperous and contented? That, I assume, is the purpose of the State Board of Agriculture. It is but one of the many agencies that have been and are being tried, or have been proposed, as being curative of the ills that harass the farmer, some of which have been of doubtful benefit, while others have done good immeasurable.

My conviction is, resulting from experience, observation and some study of the subject, that in agricultural education, properly conceived and applied, lies the panacea for which we have been seeking.

But, say some, has not this been tried and proven a failure? Did not Congress, more than 30 years ago, through the first Morrill act, make liberal donations of public lands to the different states for use by them in maintaining and endowing agricultural colleges? Yes. And did not Congress, under the leadership of one of our own congressmen, Mr. Hatch, pass an act appropriating to each state yearly the sum of $15,000 for the purpose of establishing agricultural experiment stations in connection with these colleges already established? Yes. Then did not Con-

gress, only a few years ago, enact the second Morrill bill, granting to the different colleges established under the first Morrill act, passed in 1862, the further sum of $15,000 yearly, increasing the amount $1000 yearly until it shall reach $25,000, and to continue at that sum? Yes. Has the expenditure of this vast sum of money yet resulted in an adequate amount of good? No. Why not? A full explanation of the causes of the failure of most, not all, of these colleges would require much more time than is at my disposal. Suffice it to say that in establishing them the deadening mistake was made of allowing the states the privilege of uniting them to already existing literary and classical institutions, with the result, in the majority of cases, that the students attending for the purpose of becoming lawyers, doctors, ministers and anything else but farmers got more good from the money intended by Congress to benefit agriculture than did agricultural students.

In states where separate agricultural colleges were established, as in Massachusetts, Michigan, Iowa and Kansas, they have agricultural colleges that are doing much good. I would not say that no good to agriculture comes from the united institutions; on the contrary, in most cases the managers are coming more and more, under constant criticism, to recognize the farmers' claims and to make the agricultural department serve their needs. If time permitted, I could recount to you the history of our own Agricultural College, how the farmers protested against attaching it to the State University, but were out-generaled in this by men who had other interests at heart; how, after the college was thus located, it had a struggling existence for years, deprived of the funds which were its due from the general funds of the University, the income from its land grant funds, and even the money appropriated to it direct by the State Legislature, one sum of $100,000 having thus been appropriated but converted to the State University endowment funds and there remain to this day, the college not so much as sharing in the income along with the Medical, Law and other colleges. Then when the Legislature gave to the State University the $450,000 returned by the Federal Government for war taxes paid, the Agricultural College was cut out from sharing with the other associated colleges. But on the other hand, the funds of the college coming from the Federal Government have been freely used to pay salaries of professors, whose work was mainly or wholly in departments other than the agricultural. I believe there exists now a disposition to treat the college more fairly than in the past, and yet there is room for improvement. The Board of Curators may want to do what is right, but there is but one farmer member of the Board, and as the affairs of the institution, including the Agricultural College, are practically administered by the Executive Board, comprising two lawyers and a banker, it is hardly possible that agricultural interests will receive the full measure of attention they should.

But, given an agricultural college in every state in the Union fully endowed and properly managed, I do not think they would have been all that was needed for agricultural education. They are excellent things, but there is something else needed to precede them. The colleges, even when we shall have dozens where now we have but one, are for the few; we must provide education for the masses.

Has it ever occurred to you that the vast majority of the children attending our country schools will be limited to those schools for educational advantages, and that these children will comprise the future farmers and farmers' wives of our State? Those of you who are patrons of these schools (some doubtless are trustees and some may have taught), think over the work of instruction carried on, and recall, if you can, any part that bears directly upon the business of farming or farm life.

What is the purpose of an education if not, first of all, to enable the person to the easier and more certainly earn his living, and if destiny, fate, Providence or whatever it may be called, says that a child is to earn his living as a farmer, in our efforts to educate that child should we not always have in mind what his life-work will be?

Says a writer in a recent number of the Globe-Democrat: "The prime fault of our schools is that they are intended to create shopmen, teachers and professional men, and not farmers;" and the writer quotes from Prof. Teegan, of Dublin, this statement:

"The vast majority of those whose school life ends with the primary school are destined to be engaged in some branch or other of productive industry—occupations in which manual skill is of primary importance. And yet we frame for these, to the exclusion of more useful studies, such courses as if their destination were to be the Senate; and such programs of geography as if they were intended to lead exploring expeditions into the center of Africa; and the last instruction which it has entered into our heads to give them is that which they will require in their every-day life, from the very hour they issue from school. It will be readily conceded that the art of reading can be acquired as easily from a series of lessons on the cultivation of fruit-trees as through a series containing the oratory of Burke. And surely the teaching of practical school gardening would be as valuable as setting the pupils to commit to memory the hights of the principal peaks of the Rocky Mountains."

Now, I submit, this being the case, is it not time some one undertook to bring about a reform? And by whom can this work be better inaugurated and carried forward than by the State Board of Agriculture?

It may strike some as being a startling proposition, and even absurd, to suggest the remodeling of our public school system and adapting it to the industrial requirements of the day, and seemingly insurmountable obstacles will present themselves; but we do not need to go at the problem blindly it is being worked out elsewhere, and successfully, too. In a recent article on "Agricultural Education in Belgium," Paul De Vuyst, who is connected with the ministry of Agriculture of that country, says: "Until 1884 the public authorities of Belgium had not given agricultural education the attention which its importance demanded. But when the condition of agricultural affairs had become very much disturbed, a ministry of Agriculture was established. This department at once undertook to restore the prosperity of the country by organizing, for the instruction of the farmers in the advanced knowledge given by science, a system of education as complete and thorough as that afforded by any other nation." He then outlines the system of agricultural education that has been put into operation there, comprising, in a country less than one-sixth the size of Missouri, 4 schools for higher agricultural education, 24 secondary schools for boys and 9 for girls, 40 short courses in agriculture in secondary schools, numerous courses in agriculture in normal and primary schools, and a system of lectures to farmers and soldiers. Then, in addition to this, many of the private schools, noting the popularity of this class of instruction, are adding courses in agriculture to their curricula.

In support of the proposition that a study of the principles of agriculture should form a part of the common country school work, I submit the following from a recent writer in evidence:

"France is, above all other leading powers, devoted to horticulture and small farming. It is the one country in Europe that has shown perfect recuperative ability after exhaustive wars. But France has led the way in agricultural edu-

cation. She has comprehended the fact that not only must mechanics know how to use tools and account-books, but land-tillers must understand how to use the soil. Hence, she has found it advisable to supplement the work of her agricultural colleges by introducing agriculture as a special study into her general school system. The work has been begun by training the teachers first; and while general methods have been prescribed, the system is sufficiently elastic to meet the varying abilities of teacher and pupils. The work is as yet only in the first stage of development; and, although all the rural children of France have not been reached, and the end aimed at has not yet been attained, the success achieved is very encouraging and worthy of imitation by other nations.

"The farms of France are the best cultivated in the world, and her production per capita has doubled in half a century. This could not have occurred on a basis of hap-hazard culture. While other nations, notably our own, is decreasing in its relative agricultural interests, France is working in the other direction. Now, note what the government is doing to encourage this state of affairs. For instruction in purely agricultural institutions the appropriations for 1891–92 were $850,400. At Paris is located the renowned agricultural university, also three national schools of agriculture, one of horticulture, one of dairying, three of veterinary science, two of forestry and two shepherds' schools. To these must be added a professorship of agriculture in each of the 86 departments or districts into which France is divided, with farm schools, experimental stations, fields and colonies. Besides all this, in 1850 agriculture was made optional in all public schools, and in 1879 a law compelled each normal school to prepare for teaching agriculture, and to fit all the teachers of France for instructing in land culture."

COUNTRY vs. CITY.

BY MISS BERTHA L ENSIGN, CAMERON, MO.

Is the present trend of immigration into cities detrimental to the best interests of society?

Far be it from our purpose to deplore cities. Cities are essential to the best development of the resources of any country. They are the great store-houses of the nation. The great bulk of the products of a nation is collected within their precincts, where it is organized, developed and preserved, or distributed for the common good. Cities are the great centers of power. Without the facilities that through them are afforded to commerce and manufacture, without their aggregation of capital, without their business systems and institutions, and their fostering care of art, science and literature, the civilization of the world would be much retarded. Yet, notwithstanding their necessity for advancement, and their aid in increasing the utility of national life, there are many defects in cities, many evils which extend below the surface and require persistent effort to eradicate.

It has been said by those who have made a study of city government, that American cities are among the most poorly governed in Christendom, falling in this respect far below European cities. You need only to walk along the streets of our great cities, to become aware that some evil principle is at work. Everywhere are found wretched wharves, foul docks, inadequate streets and inefficient systems of sewerage, paving and lighting. The query naturally arises, "why does this state of affairs exist?"

It seems to me that many of the ills attendant on our great cities may be traced, directly or indirectly, to over-propulation. In every city there are far more inhabitants than can find lawful employment. From late census reports we get many interesting facts concerning the present trend of immigration into cities. The proportion of urban or city population has steadily increased during the present century from 3½ to nearly 30 per cent of the whole population; or, in other words, from $\frac{1}{30}$ to nearly $\frac{1}{3}$ of the total population. During the last decade the increase in the United States of rural population has been only 8 per cent, while that of urban population has been about 60 per cent. This estimate of urban population includes only cities of 8000 or upward, while all cities, towns and villages of less than 8000 are included in the rural population. Indeed, there is little doubt that, were all smaller cities embraced in the urban population, it would appear that rural population had actually diminished in the United States.

In some states, even with the above-mentioned method of calculating statistics, we find the following state of affairs: In Maine, Vermont, Massachusetts and New York, the numerical increase in the urban element is greater than the total increase of population; therefore it is evident that the rural population has actually decreased in those states. In Illinois the urban increase was 93 per cent of the whole increase; in Michigan, 70 per cent; in Colorado, 169 per cent. This might not seem alarming if the rural districts were over-populated, but they are not, nor are they as densely populated as they might be with profit, even in the older states. Those who go from the country to the city are in many cases leaving the farms vacant. In New Hampshire alone the Commissioner of Agriculture reports 1442 vacant or abandoned farms with tenantable buildings. All over New England and the Middle states this migration from country to city is steadily going on.

The farmer's son is anxious to leave the farm. He has the idea that farming is beneath him, and he prefers to eke out a precarious existence as a mechanic or as a professional or commercial man in the city, where life is more showy, and he can have sidewalks and electric lights, daily journals, theaters and fashionable saloons. He finds all these more fascinating than the certain but somewhat slow, and often hard-earned, independence of the farmer. It is true that many do go to the city from the country and prove that the change was beneficial for them. They rise to prominence, their investments yield them large returns, and they can enjoy the luxuries and comforts of life. While this is the story of many, the story of the large majority is different. They live in abject poverty, from hand to mouth, as it were. The manufacturing and commercial interests of our great cities are large and very attractive, and they require a vast number to carry them on effectively; still, there is a limit to the number of workingmen that these interests can utilize, and in almost every city you will find a large number who are so to speak superfluous. They are almost entirely without employment, and many who find work receive wages below the living rate, simply because there is such keen competition among the workers themselves. If any one refuses to take what his employer offers, the employer does not hesitate to let him go, for he knows that there many without employment who will be glad to work at any rate whatever.

Turning to the country, we find that there, there is ample room for all. The great need of the United States is not larger farms for poor farmers, but better farmers for smaller farms; not more extensive farming, but more intensive farming. It is true that the American farmer has larger farms and more fertile soil than his English brother, yet the latter knows how to turn everything to advantage much better than the former. If all the farm land of the United States was cul-

tivated as it is capable of being, it would not be exaggeration to say that the present force of farm workers would need to be increased by one-half.

There are other considerations in this question besides that of profit. Consider how people live in the tenement parts of our great cities. There you will find embodied all the combined evils of crowding, heat, stench, filth and vermin. There privacy, decency and purity have to make a desperate and hopeless struggle for existence. How can it be a benefit to any city to have from 10 to 50 families living in one tenement-house, crowded together like swine in the midst of filth and famine and cold, with only a pestiferous atmosphere to breathe. There can be no wonder that the mortality is far greater in the city than in the country.

Thus, in cities the lack of honest employment is bad, the loss of health is worse, but worst of all is the moral loss. The corruption and servility there engendered is appalling. Vice is found there such as would make the blood of any decent man turn cold.

Another element which enters largely into the life of our great cities, seaports especially, is the large number of foreigners. Statistics show that a large part of our paupers and criminals are of foreign birth. In most American cities there are rookeries, the veritable plague-spots of the cities, and indeed of the whole country, which are recruited from the refuse of every country under heaven. It does not seem possible that loyal American citizens will permit this to go on much longer; indeed, it hardly seems credible that it has been tolerated so long. In the slums the rum-seller always finds the fields white for his harvest of drunkenness and debauchery. The people may have no money for fuel, food or clothing, but for rum they will have it and do have it. Indeed, all their surroundings tend to incite drunkenness. Time and again they are driven to the verge of despair, and seek to drown all in the flowing bowl. Someone of note has expressed the opinion that there is not a city in the United States of 8000 or upward where prohibition could be enforced. It is a well-known fact that even in prohibition states the prohibitory laws are constantly violated in the larger cities.

It is stated, and probably correctly, that many of the evils of our city life come from faulty government, and surely it is little wonder that our cities are poorly governed when you consider the political chicanery at every election. Any kind of a man may be nominated by his party and elected because he is the nominee of his party, irrespective of fitness to fill his office. There can be little hope for improvement in municipal administration until there is a decisive separation of all party politics from the management of municipal affairs. But should this needed reform be effected, while it might ameliorate the condition of the cities, it would not alter the fact that it is not for the best interests of society to have more congregate in the cities than can be made use of.

If those who have money to invest or speculate with would use it in developing the resources of the rural districts, opening up new enterprises there and encouraging intensive cultivation of the soil, their efforts would be of great value to the country as a whole, and yield them good profits, too. Our country is largely agricultural, its resources are boundless, and it shows that something is wrong when people leave their farms and flock into the cities where there is no demand for their services. It is a fact that farms in the Eastern and Middle states have largely depreciated in value during the last decade; it is also true that vice and debauchery have increased in our great cities. The aggregate of vice would be far less were one-half the tenement population sent into the country where they are needed. Although they might have the same seeds of vice, these seeds of vice would be far less likely to germinate when the wholesome food of the country was

placed before them; when they could breathe freely the pure and exhilarating atmosphere and bask in heaven's sunshine, and when the innumerable temptations of the city have been removed. Man will be civilized and christianized much sooner when the great temptations are removed from him. The futility of the argument that a man's character is never fully developed until he has met and resisted temptation, and that, therefore, it is not a bad thing to subject one to great temptation, will sometime be realized. It is useless to contend that a man is better for having come in contact with evil, even if he does not succumb to it; for it is an unalterable law that we are a part of all we meet.

It is my opinion that a large part of the money expended in city charity would be much better employed were it used in helping those who are unable to help themselves, settle in the country.

It is true that better municipal management would improve the condition of the whole city, and particularly the poorer parts; and the converse is also true: an improvement in the slums would better the municipal government, for now the character of this class is such that any skillful political trickster can make the vote of one tenement block of lawless, ignorant, depraved men balance the vote of a whole square of respectable, law-loving, law-abiding citizens.

Therefore the present trend of population into cities is not for the best interests of society, because the large majority of the poor only become poorer there; because it detracts from the general health; because it leads to a marked degeneracy in character; because the slums of the cities are a disgrace and a positive injury to the cities themselves, and through them to the country at large. Finally, the trend of immigration into cities is detrimental because the progress of the farming districts themselves has been greatly retarded by it. The idea has prevailed to some extent that the farm was no place for a progressive, thinking man. Slowly but surely the tide of public opinion is turning, and now a few are demanding that the farmer, too, needs some preparation for his work. When the whole country is aroused on this point, we shall then have better educated, more enlightened and progressive farmers, more profitable farming, and a farm life which will be attractive to the masses. God speed the day!

THE WORK OF THE WEATHER BUREAU AND ITS RELATION TO THE FARMER.

BY W. H. HAMMON,

Local Forecast Official U. S. Weather Bureau.

Address delivered at the Farmers' Institute held at Farmington, Mo.

"The north wind driveth away rain."

"For lo, the winter is past, the rain is over and gone, the flowers appear on the earth and the time of singing of birds is come, and the voice of the turtle is heard in our land."

"The wind bloweth where it listeth, and thou hearest the sound thereof but canst not tell whence it cometh or whither it goeth."

From the days of Solomon until now, men have studied the weather and sought to understand its laws and foretell its changes. That the science is a difficult one goes without proof, when we consider the many and varied influencing conditions and rapid changes that occur with the movement of the wind from place to place.

No wonder that, at the time of Christ, the uncertainty of the wind was proverbial; and so it would have always remained, had no method of communication more rapid than the wind itself been devised. It is due to the allied science of electricity and its application in the telegraph that the science of the weather has at last received a "new birth" in this Nineteenth century, and seems to be now moving rapidly toward a solution of many problems hitherto unknown, but a knowledge of which will be of immense value to the race. It is the work of the Weather Bureau to consider these problems, obtain and collect the information, formulate the results and furnish them to the public likely to be benefited by them.

That the science is still lamentably imperfect and the work of the Bureau equally incomplete and inaccurate, will not be denied by anyone who receives its warnings or makes use of its data; but, as the shrewd business man will nurse a venture with a foresight to its future profits, or the judicious farmer return to the soil a valuable crop of clover with the hope of still more valuable returns to him, so should we continue the work now surely well begun, in the hope at least that the results of the future will warrant the expenditure of the past.

It is improbable that Watt, or even Fulton, in their first discoveries and applications of the power of steam ever dreamed of the development of today. It is even less probable that Franklin, as he launched his kite on its voyage of discovery, foresaw the future usefulness of the science of electricity he was then investigating, and on which it seems as if we were as yet only fairly entering. So we, in treating this, the latest and youngest of the sciences, should not consider it merely for what it has done or is doing (though this is no mean work), but should turn our eyes forward if perchance we might get some glimpse into the possibly more glorious future that awaits us. The work of the Weather Bureau was begun in 1870 under the U. S. Signal Service. In the 23 years since that time methods of forecasting have advanced from the quackery of ground-hog, goose-bone, planets and moon (although practitioners and adherents to these methods are still numerous) to plans based on scientific principles, as yet, undoubtedly crude and imperfect, but still yielding valuable results which are continually improving.

At the beginning, forecasts were only attempted by a small board of officials stationed at Washington, who predicted in the most general terms the prevailing conditions for large sections of the country, each section usually embracing several states, and then for but 12 or 24 hours in the future. Now forecasts are made one morning for a period embracing the entire next day, by officials placed within the territory, who specify definitely the conditions expected and the time they will probably occur, and the territory which will be affected by them.

Then, too, formerly the message was given to the daily papers and to the exchanges, and a few places of business in our largest cities who were most interested in its work. Now the message is sent daily by telegraph to scores and almost hundreds of places in every state, where the information is quickly distributed by flag or whistle signal to the public. Then it is distributed by mail and railroad bulletin just as far and as widely as it is possible to send it and have it arrive soon enough to be of use. Thus not only better forecasts are made and for a longer period, but they are distributed so rapidly and widely that hardly a place or person exists who cannot receive this warning soon enough for it to be of use if he so desires it. Further than this, weather maps are made and widely distributed giving the information by which the forecaster arrives at his conclusions, and thus people are enabled to make their own forecast or supplement the forecast with this data and the conclusions their own judgment advises.

The methods employed in making forecasts are extremely simple. The Weather Bureau has stations where weather observations are taken, scattered all over the United States, about 200 miles apart as a rule. At exactly the same moment of time twice each day, an observation of the most important weather conditions is made at each station. At just 8 o'clock, 75th meridian time, if you were able, you might see the observer at every station in the country standing on the platform in front of the theremometer shelter on the roof, and reading the thermometers. In order he reads the barometer, thermometers, notes the kinds and amount of clouds and the direction they are moving, the amount of rain that has fallen since his last report, the direction and velocity of the wind, and so on.

In a few minutes the observation is completed, and the information, included in a brief cipher report usually of less than a half dozen words, is then furnished the telegraph company for transmission. By a special arrangement of wires in circuits this message is sent to the principal Weather Bureau offices in the country, and similar messages are received from the other offices in a very short time. Thus at St. Louis for instance, in an hour and a half after the observation is taken we have reports from stations throughout the country—from Helena and Salt Lake City in the west to Boston and Jacksonville in the east.

As fast as these reports are received they are charted on a map of the United States, in such a way that the forecaster can see at a glance what the weather conditions in all portions of the country are. For instance, he enters within a circle at each place a symbol which shows the state of the weather at that place, whether it is clear, cloudy, raining or snowing, as the case may be. An arrow shows the direction of the wind, and figures grouped at the side show the temperature and the amount of change for the warmer or colder since yesterday. There is also usually entered the velocity of the wind, amount of rainfall, etc. Lines called isobars are drawn through those points where the barometer reads the same, one being drawn for each tenth of an inch difference in pressure, and similar lines called isotherms are drawn through the points of the same temperature, one being drawn for each 10 degrees of temperature.

As soon as this map is completed the forecaster proceeds to make his prediction. He notes what the condition of the weather is in the different sections, especially to the westward, notes the location of the storm center and the direction and rate of movement since yesterday, then predicts where it will be tomorrow, and knowing the conditions that usually exist about a storm, he is able to approximately foretell what will happen.

The general principle on which forecasting is based is that weather conditions usually move across the country from west to east, at a rate varying considerably with different seasons, but averaging about 500 or 600 miles a day.

Besides the regular forecasts, made twice daily, there are the special warnings of frost, cold waves, etc., made and distributed at those seasons and to those sections where they will be of benefit. Frost warnings are made in the late spring and early fall when frosts are likely to do injury. Cold-waves warning are made when more decided changes in temperature are anticipated. These warnings are distributed just as widely as the money available for this purpose will admit, or as we know how.

But while the reputation of the Bureau rests mainly on its forecasts, still this is only one of many methods by which it tries to be of service to the farmer. In nearly every state there exists a State Weather service, jointly supported and controlled by the state and nation. One of the duties of this service is to collect weekly during the growing season from farmers throughout the State a statement

of the condition of the weather during the week, and its effect on the various crops. This information is compiled and distributed broadcast by press and mail. You ask "What does this do?" I'll tell you: It gives the farmer information as to the condition of the crops, by which he is enabled to tell the probable changes in prices. Formerly the speculators on the grain exchanges of our large cities obtained this information by private correspondence, and were thus able to distort the facts, causing prices to fluctuate as they desired.

The general distribution of these data, obtained in a reliable manner from reliable sources, greatly lessens speculation, for it removes, to a great degree, the element of doubt and uncertainty which is so essential to speculation, thus rendering prices more uniform and stable. In the winter time information is collected of the amount of snow on ground throughout the winter wheat section, which is valuable in estimating the effect of cold weather on winter wheat. The authoritative collection and general distribution of these data also tend to prevent the immense and unnatural fluctuations due to the uncertainty that would otherwise exist. These means also furnish to the farmer information by which he may protect himself from the misrepresentations of unscrupulous buyers, who otherwise might distort facts as to the condition of the crop to obtain produce at a lower price.

All these and many more lines of weather bureau work directly affect the farmer, but there are many ways by which the farmer is indirectly benefited by aid rendered to some associated business, for we are all allies. In most instances, what benefits you helps me, and so on. It is only in speculation and illegitimate trade that "one man's gain means another's loss." On my way down here this morning, I passed that immense old plant of the Vulcan iron works in Carondelet, now rapidly going to decay. A gentleman on the seat in front of me leaned over and said, "I used to work for that company when it employed upward of a thousand men, with a weekly pay-roll of ten or fifteen thousand dollars." No one would presume to say that the closing of that mill meant loss to the company only, or to their employes. Of the money the company receives, a large portion goes to the employes. Nearly all of this goes to the butcher, baker, grocer, etc., and thus it passes from hand to hand and we are all benefited or injured as the firm is affected.

But even in a closer way is the farmer affected by the success of railroads and transportation companies, and every means by which their losses and running expenses can be diminished permits a reduction in freight rates, and a smaller portion of the price of the commodity goes for transporting it to market, leaving the more to the producer. Now we help to reduce the losses of the transportation companies. In winter our reports warn the railroads when to prepare for delaying snows, and in the spring for serious floods. Refrigerator car companies know from our reports the probable temperature which a car will have to pass through while en route to its destination, and are thus enabled to ice in summer or heat in winter economically, thus reducing the expense of this powerful adjunct of the farmer, by means of which his fresh berries, vegetables, apples, potatoes, butter and eggs reach market in as good a condition as when they left the farm.

Further, the Bureau furnishes steamboat companies information of the existing and probable stages of the river, by which they are enabled to accurately gauge their load to the channel depth and not touch the bars, thus carrying the largest loads possible for that depth of water, and rendering river shipments more economical and the freight rates correspondingly lower than they would otherwise be, which results in a clear gain to the farmer. I have seen wheat advance one or two cents a bushel, due to the fact that the river had risen enough to allow the grain barges to load heavier, thus reducing the cost per bushel for transportation, and

allowing the companies to pay a larger price for the grain and yet deliver it at their contract price. In every such instance the farmer is benefited. Predictions of river stages are made from one or two days to as much as three weeks in advance.

We have hastily sketched what the Bureau is now doing, but as was said in the beginning, the work is as yet almost in its infancy, and we hope for much greater results in the future. As means of communication increase, so can we find out more definitely and more frequently the changes that are occurring, and thus predict more accurately, and distribute the warnings more rapidly and widely. Then, too, at present we are working at a great disadvantage. We are only able to take observations at the very bottom of this immense sea of air above us, and must almost altogether guess at what is taking place higher up above us where rain and clouds form, and where conditions exist that control the weather at the surface. As yet we know but very little about the causes of storms, or why they take the courses that they do. No one can tell the process by which rain, hail and snow are formed. In fact, we know but very little of the foundation facts of the science whose principles we are using, and are awaiting with impatience the development of a means to explore the upper air. We believe this result is not far distant. The idea of aerial navigation is being considered as never before, and not by visionary men, but by the eminent scientists and mechanics of today; and when it comes, the advance in weather forecasting will undoubtedly be great.

In the meantime, a systematic study is being made of the relations existing between weather changes and other phenomena, and already there are appearances of valuable results which may enable general forecasts for a much longer period than is now attempted. In any and all of these it is the aim to extend the work as far as possible within the limits of the appropriations made, and in the direction of those lines which will most benefit the farmer.

WORK OF THE STATE BOARD OF AGRICULTURE.

BY HON. N. F. MURRAY, OF OREGON, MO.

This Institute work is organized and conducted under the auspices of the State Board of Agriculture, and at the expense of the tax-payers of the State. The object of the Board is to promote, advance and more fully develop the industries of agriculture, horticulture and live-stock breeding, by inducing the farmers, fruit-growers and breeders to take a high stand in their respective callings, and to urge upon them the necessity for intensive and intelligent application to their various pursuits.

To induce the farmer to improve the quality and increase the yield of his crops by a more thorough system of tillage, selecting pure seed of improved varieties, rotation of crops, conserving the fertility of the soil, its improvement by the careful saving and intelligent application of all farm manures; and the growing of clover as a renovator.

To urge upon the stockmen the necessity and importance of improving their herds by the careful, judicious selection of sound thoroughbred animals, and to breed only such stock as may be demanded by the market at an advanced price.

To encourage the fruit-grower to improve the quality of his fruit, and the yield of his orchard, vineyard and berry plantation, by a more careful selection of varieties suited to our soil and climate, thorough cultivation and systematic spraying for the destruction of insects.

The Board also has charge of and directs the Veterinary Service of the State. The management has been so thorough and efficient that a marked decrease is noted in the number of infectious and contagious diseases, the number of animals affected and the counties reporting such diseases.

Glanders, that was stalking over the State, a veritable monster among the breeders of all classes of horses, has been materially checked, and it would be possible to eradicate it from the State if all avenues for its importation were carefully guarded.

In 1892 there were reported 111 cases of tuberculosis, but the service was so efficient and the disease so nearly controlled that only three cases were reported in 1893.

Texas fever, that by reason of the purchase of feeders and grazers at great cattle markets like Kansas City and St. Louis, is likely to be scattered to every feeding pen and pasture in this State were it not for this service, has been so thoroughly and effectually controlled and confined to legitimate quarters that not a single case appeared in the State during 1893.

All this work of the Board is of value and should be appreciated. That there is room for expansion, improvement and advancement in every branch of the work must be apparent to every observing mind who has given the matter thought and consideration.

The average yield of wheat in our State is a little over 10 bushels per acre. With more intensive and intelligent farming, by properly preparing and conserving the soil, the yield might be doubled with but slight increase in cost per acre of production.

There is no question of the ability of our farmers to do this upon our soil. A few men are doing it all over this State and other states, no better, perhaps not so good as ours. This is no theory, no iridescent dream, it is a fact that is practically demonstrated by a few farmers every year.

If the present yield of 10 bushels per acre will pay expenses, then the increase above that would be profit that would meet taxes, interest, pay indebtedness and provide the family with the necessary comforts and even luxuries of life.

The Missouri farmer is, as a rule, a breeder of stock, generally producing what his farm will support. This, as well as every other branch of agriculture, should have his best thought and careful consideration. There are in this State today, no doubt, at least 100,000 mongrel-bred horses, for which there is no profitable market on the face of the globe. These horses have been bred without thought, consideration or intelligence. Mares have been mated with cross-roads stallions, because they were cheap or convenient, that would not have made fair geldings. Blood lines, speed, action, style, draft qualities or no other object was considered or sought. Men bred to get a colt and they got one that perhaps cost a little less for service fee, but as much for feed, care and development, and now at maturity, when it ought to pay a profit, no man wants it at any price.

Yet fancy drivers, saddlers, coach horses and good drafters are produced at a handsome profit. To aid in correcting this evil, in eliminating the scrub, and in suppressing indiscriminate breeding, to suggest and encourage the judicious mating of improved stock, is a grand work for the State Board of Agriculture.

Again, when fruit-growing is suggested, it is claimed that there is danger of growing too much, and that we will have no market for our products. If this be so, why is it we are buying millions of dollars of the products of California and Eastern states and foreign countries? Why is most every grocery store in this State filled with fruit and can goods produced elsewhere? Why is it that we are

now buying grapes produced in New York and California, kept in cold storage till we need them, then shipped to dealers and retailed all over the State? The Board of Agriculture would suggest that we ought not to talk of over-production till we have at least supplied our home market with all the products that can be successfully grown or manufactured within the borders of our own great State.

This work of the State Board of Agriculture, notwithstanding its value and importance, is not appreciated by some, and is openly condemned by others. But this might be expected, when we consider that every step toward progress and advancement, every great undertaking that has been suggested by the best thought of the most fertile brain, was at first condemned, and succeeded only in the face of the most stubborn opposition.

But we are pleased to note that the wintry day of opposition and obstruction to the work of the Board, and to progressive agriculture in Missouri, is yielding to the genial sunshine of encouragement and support; that our meetings, in general, are well attended and highly appreciated, and where held the second time show an increased interest and attendance.

We hope to see the energy and enterprise of our State aid and assist the Board in this work, and that by another year we may be able to hold at least one meeting in every county in the State.

We have a State that is unexcelled, possibly unrivaled, in natural resources—one whose possibilities have not yet been measured by the mind of man; one that has done well, but not enough; one that took 400 awards at the World's Fair, more than any other State, and might have taken more; one that every citizen should be proud of, and strive with an earnest zeal to develop her great natural wealth, and carry her onward and upward till she shall fill that high and noble destiny for which nature and nature's God has so eminently endowed her—the highest and best in the grand galaxy of the American Union.

BUSINESS FARMING.

BY T. B. TERRY, HUDSON, OHIO.

He who wishes to run his farm in accordance with the soundest business principles, and thus make it pay best, both in money and pleasure, will first sit down and do a large amount of studying and reading, and thinking. There may be much hard work done on a farm nowadays, and little or no profit. Once the profit mostly came from muscular force; now less of this is needed and more directing force, more brains, more thought. Time was when only the man strong in body could hope to succeed on a small farm. Now if he has a good brain for business management, lack of strength may not stand in his way. Horse muscle can do most everything. But strong men can be hired at about a dollar a day, while the time of a clear-headed business thinker and manager may be worth $3 or $4, or $5 or more. Thought will lead the business farmer to arrange his farm quite differently from what was good enough for grandfather's time. He will try and get all land suitable for tillage together in one enclosure, so as to save the expense of inside fences, and then he will arrange for a regular rotation on this, so as to get the benefit that always comes from this source, particularly from growing clover as a renovating crop once in three or four or five years. Do you say that one could not pasture the fields in grass if they were not fenced separately? The thinking farmer as a rule will not wish to do this. On many farms far more damage is done by the tramping of stock on cultivated land, and by their eating closely, than the benefit received warrants.

On soils any way heavy at least, the best results in tillage can never be obtained on land tramped by stock. Have permanent pastures, and feed soiling crops, if more is needed, and by this better management make more money. These fields for tillage will be made long to save unnecessary waste of time in turning at the ends. They will be cleared of every obstruction to fast work; large stones sunk, little ones picked up, all stumps and trees removed, all swales and wet places tile-drained, so one can go right straight through, and get a right straight crop too. This is business, and very simple, but on thousands of farms matters are not in this shape.

If the subsoil is clay and holds water, thus not giving natural drainage, the business farmer will soon study out that his only hope of success lies in tile-draining his cultivated land, regularly, so he can be almost master of the situation, as far as injury from excess of water is concerned. I say, almost master.

Drainage does not always protect us entirely in very wet seasons; but without it there can be no first-class business farming on clay land, now-a-days. When the country was new, more vegetable matter in the soil, and holes left by decaying tree roots, drainage was not so necessary as now. True, you can surface-drain your land, and get some results; but this is wasteful of fertility. The water should soak down gradually, every gallon paying you tribute, and passing away through the tiles, or porous subsoil, after it has done all the good to your soil that it can. This is business farming, not luck farming; and the better luck you have will soon pay the cost, under business management.

But now with the farm arranged properly, and cleared and drained for business, thought will lead the farmer to grow the crops that are best for his soil and circumstances, and only those, and not too many of them—no more than he can attend to the best he knows how, and on time nearly always. On thousands of farms some crop pays better than others. Arrange to grow what pays best, and drop off something that does not pay. Is not that business? My own soil is particularly well adapted to potatoes, wheat and clover; I found that out, and gradually dropped off everything else.

I would have been poor to this day on my little farm if I had not been governed by this sound business principle. I buy butter for our use, and oats for our driving horses sometimes, etc., and make money by so doing, just as I hire my horse shod. I might shoe him; I might raise oats, but I can do better.

Having the best crops for the land, and not too many, enough for a good rotation of course, but stopping right there, then a man has a chance to do good work, to take care of everything nearly as well as he knows or can study out how. Here is the only chance for great success. There is no money, no profit in average crops—no, not in fairly good crops of late years. You must manage to raise large crops and do it cheaply, and then you will prosper. With the best crops for your soil, and labor and thought concentrated into a few, and not too many acres either, you are on the right road.

Half-way work, ordinary work, no longer pays. Find what you can do best on your farm, and then do that with all your might.

But don't spread over so many acres that you cannot do your very best on each and every one. There is no guess-work about this advice, no theory; cold, stern facts and figures will back it. If you grow 15 or 20 bushels of wheat to the acre and about 100 of potatoes and other crops in proportion, in a good season you just about get paid for the labor expended and seed and use of land. There is no real profit. You may do this on more acres, and still there is no profit. Spread as far as you may, but concentrate and grow 25 to 35 of wheat, and about 200 of pota-

toes and other crops in proportion, and you may so manage as to have a very large net profit. One seldom sees a farm where there is not some crop growing that better not have been put in by a business farmer, or where every crop has had the care or food that it needed for the best results. All this can be corrected by thought and management in time. Your speaker has done it on his farm. He would not be here if he had not. You can do it.

But now you ask, how is one to know just what crop pays best, or what to drop off? Why by weighing, measuring and keeping accounts, simple business methods, without which you can only work along in the dark, or on guess-work. Let the brain direct the pencil, so as to make your hand labor as effective as possible, and of course you want to keep account of all money received and paid out. No business man should do less than this. In addition to this cash account a farmer should have a bank account. You say you wish you had one, but you are too poor, never have any money ahead? Well, that is the very way to get ahead. A man who lives from hand to mouth buys in small quantities, and perhaps on credit, pays on the average not less than 25 per cent interest on the money. If in debt, it would be more business-like to borrow money at 6 or 8 per cent for a bank account, and always pay cash down, and buy by the quantity, barrel, box or package. I assure you that on this point, as on every other, I am simply advising you to do what we have done on our farm, and found to be sound and practical. For some 25 years, when in debt as well as since, we have had a bank account—that is, a little business capital—that we could draw on. Sometimes the balance got very low, and in a very few cases at first we were obliged to get some credit, but as a rule we have paid cash down and bought by the quantity, and often of first hands, saving us quite a little money. The business farmer will stop producing a little of everything and trading it off where a price is set on everything he brings in or takes away. He will have enough of what he produces to sell it in a large way, for cash, and give his whole attention to it, so as to have it of the highest quality, and he will get directly all there is in it. Then his purchase can be for cash down, and where the money will go the farthest, just the way other successful business men do. Do not understand me as saying a word against middle-men or dealers. Many farmers, as they manage, would starve without them; with the cost of book-keeping, and the credit system and its losses, their business is often none too good. But let our farmers become business men, and sell a fine article by the quantity, and buy by the package largely, for cash down, and the dealer can then become a sort of commission man, or wholesaler, and can do business on a very much smaller margin.

I do not need to tell you that the business farmer will stop every leak in the stable floor, and about the farm and yard, will save practically all his manure for his crops. Take the country over, at least one-half the manure is wasted in one way or another.

Good business methods, such as cement floors and use of land plaster in the stable, and equally good management outside, would save it all. No other business but farming would stand such leaks as one sees in this line on many farms. We want all the manure and clover to feed the concentrated crops up to a production that will pay largely. I know hard-up farmers that will allow $50 to $100 worth of manure to go to waste in a year; and there are plenty who lose many dollars' worth every year by unnecessary exposure of implements when not in actual use.

Little silent losses, a few cents a day on that wagon out in the rain and wind when not in use, more tomorrow on a binder or manure-spreader left out over night uncovered; not much alone, but like the silent waste of manure, it will amount to

a snug little sum in a year. Practically this can be saved, as can the loss of manure, by a business farmer, and saved so as to pay a large margin of profit. We have arranged to do it on our farm. The business farmer will study to reduce the cost of production in every way. Manure saving, clover growing, rotation, many of the matters already mentioned, help reduce the cost of growing a crop by giving us a larger yield per acre. But we can also study to save labor, or rather to make our labor more effectual, to do a thing just as well or better, but faster. For example, we used to plow but one furrow at a time for potatoes, and cover the same way. Now we plow two at a time and cover two as fast and do it better. We used to hoe by hand, but now we do it 10 or 20 times as fast, with smoothing harrow and weeder, and usually keep crop cleaner. We used to dig potatoes by hand, paying for the labor. Now I do it 10 times as fast as I could with a fork, by using the horses and a machine that a large grower can afford. It is a fact that during the last 15 years, by constant study in that direction we have reduced the cost of production about half.

Much more might be said in this line, but enough: you get a general idea of what I think a business man should be. With such management he will succeed if reasonably well situated as to soil and markets. Frankly, we have nothing to complain of on our farm in the way of hard times, although we have had to sell our wheat most too low lately. But we have sold our crop when it paid nearly 200% net profit. Everything has its ups and downs. I would like to see better prices of course. Some things are not quite right. There are wrongs that can only be righted by legislation. But all such troubles are felt less in the pocket-book by the level-headed business farmer. It might please some better if I would lay all blame for hard times to somebody or something away from home, but truthfully I cannot. Better business management will help us greatly both in the way of profit and pleasure. There is a pleasure about excelling, doing one's best, conquering in spite of great obstacles, that does not come from ordinary work. Now, I know well from experience how hard it is for one without money, and perhaps considerably in debt too, to put his farming on a business-like basis, such as has been outlined. It seems entirely impossible oftentimes, and still it can be done. Man can do almost anything. Not in a year, or ten perhaps, but little by little we can push forward in the right direction, and eventually bring everything out right. I would gladly tell you an easier way, but I don't know of any. We must work for success, and work hard and persistently, with head and hand. If we lack capital to work to the best advantage, it is our own misfortune, but nothing against the business. We must get the capital. Push and pluck will soon do it in this great country if the management is business-like, and the end promises full pay for the trouble. I do not know of any man on earth more to be envied than a business farmer who has succeeded in paying for his farm and getting it well improved, and who has a little money ahead and a beautiful, healthful country home, with its fruits and flowers, and pure air and pure water, and elbow-room and sunshine, who always has work enough, and knows no master but God.

AGRICULTURE AND ITS NEEDS.

BY HON. A. S. SMITH, HANNIBAL, MO.

Mr. President, Ladies and Gentlemen:

The agriculture of the United States of America is the grandest in the extent of area, diversity, magnitude of crops and opportunity afforded in natural resources of any country on earth. Hence, to deal with it as a subject of special consideration, or even to treat it in a general sense, is to grapple with a theme, the immensity of which reaches beyond and outweighs all others. This proposition will need no elaboration to those who are present, and whose minds are already directed to its interests, growing capacities and increasing facilities. That it outranks all other earthly things was established, not only as a primal truth, but whatever the shifting change of human circumstance, it must remain the basic support and rest of all other human employment. A few thoughts directed to the title of this article, even though they be of a random character, will not be out of place.

We have seen agriculture advance from the most primitive methods of practice to its present high art, based upon the most assured demonstrations of scientific experiment and the most expert application of human skill. This advance, it is safe to assert, has, in the main, been made without the fostering care or oversight from the Government that has been accorded to other industries, and with the great bulk of the burden of taxation resting upon it. Up to only a few years ago, agriculture received no governmental recognition or legislative aid.

The first recognition given to agriculture of its importance as an industry was in 1862, when the Department of Agriculture was created by an act of Congress of that year. It will be noted that our great civil war was then well advanced, and it should be set to the credit of Congress, that with our grand civil institutions imperiled, and an unholy, fratricidal war settling like a pall over the nation, it yet found time to consider the needs of our greatest productive industry, which was destined to bear the heaviest burden of that fearful struggle. In a paper read in an Institute held at Centre, in this county, in December, 1890, I gave a brief history of this Department; the object of its creation, and what has been accomplished for agriculture. It will be found on page 268 of the 23d Report.

Since May, 1862 (despite the depressing and desolating influence of civil war and legislation, the effect of which has been to discriminate against agriculture and in favor of manufacture and other industries), agriculture has made enormous strides in production and general advancement of those who follow it as a calling. The last legislation to give agriculture rank and dignity, aside from that with which it is endowed by the God of nature, was the elevation of the Commissioner of Agriculture to that of Secretary of Agriculture.

With but two exceptions, the farmers of the United States enjoy no advantage over those of many another country. These exceptions are the general freedom of our institutions, and a right to ownership in fee-simple of the soil they till. These exceptions are priceless in themselves, but other well-established governments lend a fostering aid and oversight to agriculture, that would, in many instances, put us to shame.

But it is more the purpose of this article to speak of the general needs of agriculture, than of its progress. What it has accomplished is a matter of history, accessible to all.

Opinions vary as to its more prominent needs. The great need of agriculture, at the present, is solely within the power of appropriate legislation to relieve. There are nearly 25,000,000 of our people engaged in agriculture; the larger half

of whom are producing, to a greater or lees extent, some of the breadstuffs, especially that of wheat. And yet, this vast army of producers are at the mercy of a set of conscienceless grain sharks, who, at will, set at naught the great natural laws of supply and demand, depress or inflate prices to suit their whim or necessity of dealing, and destroy or restore the normal balance of the grain trade, as circumstances may dictate. Perhaps there is no other country that permits such latitude in this species of commercial gambling, and certainly, no other people that would have borne this wrong with so much patience.

Attempts are being made to break the power of this organized system of fraud and robbery, but with slow progress toward success. Speculation of every kind can never be abolished or destroyed, but it can be limited to the conditions of actual ownership, and the delivery of things contracted for. The power of a few individuals to make or destroy the market in the greatest staples of American production does not speak well for our American institutions, nor offer much encouragement to the future producer. It is certainly the bitterest irony of fate that places the overburdened farmers of this country, who support the great army of non-producers, under still further tribute to the cupidity and avarice of a trifling few, "who toil not, neither do they spin."

Dealing in "options and futures" must be legislated out of existence, and the normal demand upon supply restored by actual and legitimate transactions in the cereals and cotton; that uninterrupted and equitable distribution of these most important staples may be secured, and the farmer assured of a just profit upon his products. The majority of us have for years been justly complaining of the onerous international commercial provisions, behind which the great capitalized interests of this country have entrenched themselves; but we have tolerated, and even encouraged, a domestic system of commerce, which preys as mercilessly and unscrupulously upon the producer, who, of all others, has most cause of complaint against this iniquitous system. Let us hope that the Congress so near at hand will complete the work so well begun in this direction, and that state assemblies will ratify and clinch its work with parallel enactments; that in the future the price of our productions may be fixed by the producer and consumer, and not by the speculator.

Untrammeled and unrestricted distribution of all the products of the world is the only theory of business commerce, because it is simply natural barter and sale. All artificial conditions, to whatever applied, must eventually work to the injury of those who are subjected to their restraints and modifications.

Let us now refer to another and distinct need of the present and future agriculture of this country. The policy of our government which has permitted the alien and domestic acquisition of large tracts of our unsettled territory, secured by individual title or syndicated capital, and which has granted immense land subsidies to railway corporations, has retarded rather than encouraged the advancement of agriculture into our undeveloped territory. The ownership by syndicates has withheld from settlement very much of the most valuable lands, while the great northern and northwestern lines of railway, with the elevator companies along them, have been enabled to charge and collect the bulk of the farmers' profits, who ship and store with them. If our government must subsidize any industry or interest within its borders, let it be agriculture first, and then let it be agriculture second. The history of the world demonstrates, and our experience teaches us, that all other things will follow in due sequence.

I have treated these topics as national needs of American agriculture, and have selected them because I know that special subjects relating to the science of applied

agriculture would be more ably treated by others present. Of one thing I am fully satisfied, and that is, that agriculture is as much a progressive science as any other, and that it needs only to be surrounded with those environments that will encourage and insure a fair reward for its efforts and free it from artificial and adventitious restraints Methods of practice will then leap beyond present imagined bounds.

HORTICULTURE IN MISSOURI.

BY HON. N. F. MURRAY.

The production of a high grade of all varieties of fruit is a matter of interest and importance to every citizen of the State.

Those who grow them should understand how they may best and most profitably do it, and to those who consume them, it is only necessary to say that an abundant supply of all varieties in their season, from the Strawberry Queen to the Red Apple King, is not only a luxury but a necessity that insures health, eliminates many of the ills and evils of life, and enables you to practically dispense with the services of your physician.

In urging the importance of the fruit interest of our State and her possibilities in the way of horticulture, I would not have it understood that I under-estimate or do not properly appreciate the stock-breeding, grain, grass or other industry for which our soil, climate and location are so eminently adapted. God knows I like to see—yes, love—our beautiful farms with substantial farm-houses, barns and outbuildings, well-filled granaries, golden fields of grain, and luxuriant pastures of blue-grass, with hills and valleys covered with well-fed and cared-for herds of improved stock, and the comfort, contentment and happiness that can be found so naturally and perfectly under no other circumstances.

Nor would I be understood to advise all our farmers to engage in commercial fruit-growing. This would be indeed a very serious mistake. No farmer can pick and market berries successfully and properly when his attention is required in his corn or harvest field. One industry or the other must suffer; possibly both.

But he can grow to an advantage a sufficient supply for family use of all varieties to which his soil is adapted. No farmer should be satisfied, nor should the good wife or affectionate children permit him to be content, till he does this.

It requires but little ground, a small amount of money, if judiciously expended, a little labor, a little intelligence, to grow an abundant supply, and it is in the interest of health, pleasure and economy to do so. The work is light, the women and children are naturally fond of fruit and flowers, and you will find they will take a deep interest and render much valuable assistance in this small but necessary department of your farm.

Our State is unexcelled in the production of a great variety of fruit, in proof of which we point with pride to the numerous awards and medals now in possession of our State Horticultural Society. These awards have been taken at the great expositions throughout the country. For the best and most varied assortment of fruit, we have never taken second place when brought in competition with the hottest company and the finest exhibits from other states.

The apple is the recognized king of all fruits, and the area for its successful production in the United States is limited to a strip 500 miles wide by 1500 miles long. We believe that many of our farmers could profitably plant a large orchard

of winter apples, of standard varieties, such as Ben Davis, Jonathan, and others suited to your soil and location. Corn or root crops can be grown in the young orchard for the first five years, at which time your orchard ought to begin to bear fruit. The picking of winter apples may be done at a time of leisure with the farmer, just after corn-cutting and wheat seeding, and before corn is ready to crib. To the stock-breeder I would say, your orchard, if you have one, will require the least care in the winter at a time when your stock should require the most, enabling you to profitably follow the two industries, the one not conflicting with the other.

You will have no trouble in finding a buyer for well-shaped, red winter apples, and the more of them the better. If you have enough of them to attract attention the buyer will find you, and you will find the income remunerative and satisfactory.

In 1890 Missouri sold 5,000,000 barrels of apples at an average of two dollars per barrel, and this is said to be as many apples as were produced the same year in all of the other states of the Union. Many were exported to England, that country having paid us in four years, prior to our last two failures, $11,000,000 for apples. We know of one orchard of 800 trees that produced over $17,000 of apples in the first 17 years from planting. Another orchard of our own net $40 per acre for 20 years—the highest yield in one year being $200 per acre, and the average for 20 years from time of planting was $40 per acre, or 10% on a valuation of $400 per acre. We think this pays. It is better than any investment we know of, and safer than a bank deposit.

The two general failures of the apple crop in the United States, the past two years, have attracted a good deal of attention and have been a topic of general discussion. The cause has been a mystery to some, but may be very readily accounted for. The long-continued rain-storm of 1892, with a very low temperature, when the apples were in bloom, destroyed the crop in two ways. The rain destroyed the pollen, and fertilization being thus prevented, the fruit either failed to set, or, being imperfect, dropped off prematurely.

Then again, the same cold continued, and excessive rains, checked the flow of sap, produced an unhealthy condition plainly indicated by the sickly, crimped and blackened foliage, evidence of a condition under which it was impossible for trees to produce healthy and vigorous fruit-buds for the next year's crop. Hence the failure for 1892 and 1893.

Two failures in succession are to be deplored and regretted, but should not discourage the horticulturist. Such conditions may not occur again in 25 years. Such failures are encountered upon every line of investment and in every undertaking in life.

Man was destined to encounter reverses, nor was it intended that he should pluck the rose without its thorn, nor taste the sweet without its admixture of bitter.

Let me urge you not to neglect the orchards now. Stand by them now in this their debilitated condition, and wait the return of vitality. They already indicate the return of health and vigor, and without further trouble is in store for us, there is no reason why we should not gather a good crop next season.

A few timid souls have fears of the over-production of fruit. Don't let this trouble you. It is the same old story I heard 40 years ago, and the same class of calamity howlers are repeating it today. Since I first heard it the fruit industry has made rapid growth, and has many times doubled the volume of production,

yet the price has steadily advanced, and for the last few years a bushel of good Missouri winter apples has been worth as much as a bushel of wheat.

In the Dakotas it takes from six to eight bushels of their wheat to purchase a bushel of our apples. With new states and territories filling up, the growth of our cities, the increase in the export trade, the many ways in which fruit may be prepared for the market, with railroads and ocean steamers carrying our fruits to all parts of the world, and the area for profitable commercial orchards limited, you need have no fear of over-production.

Every year the people of Missouri spend hundreds of thousands of dollars for grapes grown in New York and Ohio on lands worth from $100 to $300 per acre, while Missouri has millions of acres of the finest grape lands in the world, that are now idle, and can be bought from $1.25 to $8.00 per acre.

In South Missouri on the plateau and the southern slope of the Ozarks there are millions of acres of the finest fruit land on earth, whose virgin soil awaits to be turned to the kisses of the sunlight of heaven and caressed by the intelligent, energetic horticulturist; and yet Missouri pays enormous sums each year for the products of the orchards and vineyards of California, New York and Ohio.

The fruit industry in our State is in its infancy. If properly encouraged, we ought to sell $50,000,000 worth of fruit each year, and not detract from but rather add to and advance our other industries.

All orchards should contain several varieties, which should be planted in close proximity to each other, as all fruits are benefited to a certain extent by cross-fertilization. Bees are an aid in this work, and should be considered of value to the orchardist.

All trees should be planted in a carefully well-prepared mellow soil, no deeper than they grow in the nursery. Deep planting dwarfs the roots, and the tree, if it grows at all, becomes top-heavy, and yields to the wind, while those planted as they grew, with roots running in the surface soil and extending a greater distance from the tree, furnishing a better support, are better nourished, and become strong, vigorous and fruitful.

Cultivate your orchard like a garden. Protect the trees from rabbits with wire cloth cut in strips and placed around them. These may be left on all summer, and are at least a partial protection against the borer. Beware of over-pruning. Many orchards are ruined in this way. Trim to form a low, round top; cut out the cross-limbs and quit.

Buy your trees from your home nurseryman, and don't worry about whole roots or piece roots so you get good thrifty trees, true to name, with good roots, then take good care of them and you will succeed.

And last, but not least, don't think it extravagant to plant evergreens, shrubs and flowers. Plant them all, make home attractive, surrounded with all that tends to exalt and embellish civilized life. Such homes become doubly dear to their occupants, and the children reared in them, roam where they may in after life, will remember the good old home with feelings of gratitude and joy—the very thought of which may restrain them from the path of vice and crime.

Seek to bless your home and community with an earnest, honest, active, generous life, and remember the sentiment so beautifully expressed by Whittier:

That he who blesses most is blest,
And God and man should own his worth,
Who toils to leave as his bequest
An added beauty to the earth.

ANTHRAX.

BY DR. JNO. S. MEYER, ST. JOSEPH.

Anthrax, also called splenic fever, charbon, malignant carbuncle, gloss anthrax, carbuncular fever.

Anthrax is mentioned in the scriptural narrative as the "blain," which affected both man and beast. It is described by the Greek and Latin writers. The Latin writers termed the disease *sacra ignis* in animals and *carbunculas* in man.

Anthrax, though now of rare occurrence among horses, frequently raged as a malignant epizooty throughout Europe in past times. The 17th and 18th centuries were remarkable for the devastations made by many epizootic outbreaks of anthrax.

In 1617 it was of such a fatal type that around Naples over 60,000 persons perished from partaking of the flesh of animals which had died of the disease.

In 1731-2 an epizooty of gloss anthrax raged among the domesticated animals in the states of Central and Southwestern Europe.

The years 1757, 1763, 1779, 1780 and 1800 were marked by a charbonous malady, which extended nearly all over France, and affected all the domesticated animals.

Gerlach, in 1845, first demonstrated the contagious character of the disease; and Pollender, in 1855, first demonstrated the vegetable rod-like organism, bacillus of Danaine, or bacilli anthracis, as they are termed, peculiar to the malady.

Geographical Distribution.—Anthrax is of universal distribution, no climate being exempt from its ravages. As an epidemic and epizooty among men and animals, it breaks out in Siberia, where it is termed the "Siberian plague." As "Loodianah disease," it is of frequent occurrence in Central Hindostan. In Australia it is termed "Cumberland disease." It is also met with in North and South America, and Central and Southern Africa.

Definition.—Anthrax is an acute infective disease of rapid development and extreme fatality, appearing usually in an enzootic form, affecting all animals, including birds and fishes, but more especially solipeds and ruminants, and characterized by the presence and rapid multiplication of the bacilli anthracis in the blood and tissues.

The immediate cause of this disease is the entrance of the bacillus anthracis into the blood and its development there.

These vegetable organisms may gain entrance into the system by direct inoculation, by the digestive tract or by the air passages.

Anthrax is especially prevalent in low-lying, swampy districts, where the soil is rich in organic matter and salines—these conditions being in the highest degree favorable to the growth and development of these low forms of vegetable life.

The same influences, also, may act upon animals, rendering them more fitted for the reception of these germs, and we know from many experiments of what great significance the nature of the soil or pabulum is to the growth and multiplication of bacteria. We may mention three instances:

Fowls were once believed to possess an immunity against anthrax. Now, M. Pasteur showed by immersing fowls in water, and thus lowering their temperature, he was able to inoculate them with the disease; though when not immersed he was unable to induce the development of anthrax in them.

Again, rats, when fed on animal diet, resisted inoculation, while others fed on bread readily contracted the disease.

Chauveau was unable to inoculate Algerian sheep by the ordinary method, though virus from the same vessel readily induced the disease in other sheep.

These experiments illustrate clearly of what importance the nature of the soil is to the growth of the germs placed in it. Animals in which no other disease is present, and those in a plethoric condition, are especially liable to attack, and young animals, also, are more likely to contract the disease than older ones. And it is in those warm, low-lying, marshy districts, where food especially rich in nutritive value is grown, and where, in consequence, animals are best nourished, that they afford a more genial soil for the reception of these vegetable parasites.

Again, it has been shown in many cases in moist districts, where anthrax has been long endemic, that after thorough drainage the disease disappeared entirely.

A hot, stifling atmosphere, charged with electricity, is said also to favor the development of these germs.

Many attacks have been traced to the indiscriminate burial of diseased carcasses. According to M. Pasteur, the spores of the bacillus are brought to the surface by earth-worms, even 10 to 12 months after burial of diseased carcasses.

Dogs after feeding on diseased flesh, may bite sheep, and thus inoculate them with the disease.

Flies feeding on anthrax blood have been shown to absorb sufficient poison in their proboscides to give the disease to animals inoculated with the contents.

Anthrax may be spread by eating contaminated food, by water percolating the soil and carrying with it the germs of the disease. Knives uncleaned may also propagate the disease.

The germs are said to be more volatile in spring and summer, less so in autumn, and still less in winter.

Although anthrax has not been shown to be infectious, yet there is every probability that it is. The disease often first appears in districts where it may be enzootic, and then assumes an epizootic form.

Incubation.—Varies from a few hours to one, two, or even four days.

Symptoms of Anthrax, without Special Localization, or Anthrax Proper.—This disease is rare in Great Britain. The symptoms appear suddenly. The horse has violent muscular tremors, perspires freely, and breathes with difficulty and irregularly. There is complete loss of control of the muscular movements, especially of the lumbar muscles, and those of the posterior limbs in particular. The animal staggers, and dies convulsed. These acute symptoms, especially those of nervous complications, may, however, abate in two or three days, and finally end in death or recovery. However, the symptoms are not always so rapidly developed. They may begin with small, weak and dicrotous pulse, uneven surface temperature, and violent tumultuous action of the heart. The internal temperature is high, but generally falls before death; the conjunctival membrane is swollen and of a yellowish hue. There is disinclination to move, incordination, and loss of power in the muscles of locomotion, and twitching of muscles in various parts. Drowsiness and stupidity, with much prostration, are marked symptoms. There is a yellowish discharge from the nose, often tinged with blood, and the nasal membrane is often covered with blood extravasations.

The breath is fœtid, and the superficial lymphatics swelled; abdominal pain, shown by uneasiness, pawing and looking to the sides, is sometimes manifested. The feces are fluid or blood-stained; the skin is harsh and dry, and in some cases it crepitates when pressed upon fleshy portions of the body. The respiration becomes tumultuous and hurried, the nostrils dilated, and the animals foam at the mouth. The temperature declines, the animal staggers at every step; convulsions, and delirium and coma ensue, and death closes the scene.

Anthrax in horses is not so frequently marked by local symptoms as in the ox and sheep. Nevertheless, a critical eruption of so-called anthrax tumors is sometimes present in certain epizooties, in which horses as well as other herbivorous animals are involved.

At a certain stage in these febrile symptoms there is an external eruption in various regions. This consists in the development of "tumorous" or "anthrax pustules" in the interstices of the muscles, in the loose areolar tissue, and in the lymphatic glands. They are especially met with in the submaxillary space in the upper part of the throat, the lower part of the neck behind the shoulders, and on the back.

They may appear as small rounded nodosities, about the size of a walnut, and having, as it were, a pedunculated base.

In other cases the tumors appear suddenly as large, soft, crepitating, undefined swellings and invade many surrounding parts. As they rapidly extend they become cold and insensible, and vesicles appear on the surface. These vesicles, quickly bursting, discharge an irritant serous fluid. If the hand be passed over these swellings, crepitation may be felt. This is due to gas from the decomposition of the tissues collecting in the connective tissue, and thus rendering the part emphysematous. This is a special feature of the tumors of anthrax.

Sometimes the tumors appear without being preceded by any very marked symptoms, and their course is in all cases the more rapid the earlier they make their appearnce. In two to eight hours they attain a large size, and the surrounding tissues modify as they are invaded.

As the tumors are developed the fever abates and the urgent symptoms vanish. When they have attained a certain proportion, general symptoms are developed, which vary according as the malady takes a favorable course or not.

In some rare cases the tissue of the tumors is suddenly absorbed, and abundant sweats and fetid diarrhœa ensue, and the animal recovers rapidly. In some cases the tumor disappears by resolution, but generally the tumors vanish, and coincidently the disease assumes all the characters of anthrax fever without local manifestations; the general symptoms reappear, and the horse dies in about twelve hours.

Treatment.—For the curative treatment almost every drug in the pharmacopeia has been used without avail, except perhaps the use of iodine, injected in the circulation in as large quantities as could be tolerated by the system. This treatment gives good results in the human being, but requires too much personal attention to be economical in animals, when the disease occurs in epidemic form, although it may be used in animals of great value.

General treatment consists in changing the animals into other pastures with thorough drainage, and by inoculation. This virus is prepared in this country in private laboratories.

BROOM-CORN.

BY W. F. WRIGHT.

(Read at Farmers' Progressive Union of Mountain Grove, Mo.)

I wish to say a few words in favor of growing broom-corn in this section. Prices ruling high, there is big money in it.

Land to be planted in broom-corn should be plowed as early in the spring as possible, or, better yet, the fall before, so that winter frosts and winds will mellow the soil. Then at planting time it should be plowed again and harrowed down fine both ways. No time must now be lost in getting the seed in the ground, so that it can come up and get ahead of the weeds, for the young plants are very small at first. The variety known as the Missouri Evergreen is the best kind for main crop. For very rough or foul land it should be checked both ways, the same as Indian corn, with five to six plants in a hill. When checked both ways the cultivator has a good chance to subdue the weeds. On clean, smooth land the best way is to drill it, the plants to stand four to five inches apart in the row.

The proper time to plant in this latitude is from the 15th of April to the 15th of May. Although my best piece of broom-corn last year was planted on or about the 20th of June, it grew about 10 feet high and was a perfect wilderness of broom-corn. Those growing large crops can make a planting every 10 days. By so doing a few hands can save it at the right time without loss.

As soon as the plants can be seen along the rows cultivation should begin, and be kept up until they are as high as the back. When the brush is well out and the seed in the milk it should be cut without delay, for if allowed to stand some of it will turn down and be crooked, and all of it will turn red, which will decrease its value one-half. When ready to cut, it is first tabled: that is, to take two rows and break across each other 3½ feet high. This forms a table to lay the brush on, also the right height to work on either side to cut. Leave the stem four inches long on the short brush, and two inches on the long. It is left on the table four or five hours to dry out a little. Then it is taken to a broom-corn scraper and the seed taken off. From the scraper it goes to the curing house, whose roof and walls should be good, and laid on slat shelves two or three inches thick, one above and the other with air space between. If the weather is rainy or damp, the doors must be kept closed; if fair, left open. When so handled it will cure in about three weeks, a beautiful and durable green—a color necessary to sell well in the market. When it is thoroughly cured dry, it is taken to a broom-corn baler and put into bales weighing 250 pounds to 400 pounds, when it is ready for market.

An average yield is a ton to three acres, according to a careful estimate. Our 10 acres of broom-corn the past season averaged at the rate of 700 pounds per acre of good green brush that would sell in this market for six cents per pound, or $42 per acre. Indian corn that grew right alongside of it in the same field made 40 bushels per acre, which is worth 50 cents per bushel, or $20 per acre. This leaves a balance of $22 in favor of the broom-corn over that of the Indian corn. The soil and cultivation of each crop was the same.

Broom-corn is a hardy and drouth-resisting plant, and will yield a fair crop when corn will fail. We hope yet to produce by rotation and fertilization, from 1000 pounds to 1200 pounds of brush per acre, and 75 bushels to 100 bushels of corn per acre.

Thanks to the State Board of Agriculture and its institute workers, they have raised the curtain and let the light shine on the farmers among the Ozarks. May

their annual visits never cease. This South Missouri soil and climate are well adapted to the growing of the very finest green brush, which has sold in the past five years at four cents to seven cents per pound, with an average of about five cents per pound. Judging from the past, we think these prices will hold for the future.

I do not think it will pay farmers as a rule to grow it for a single year, as it takes about that length of time to understand the business; besides it requires a cylinder scraping machine, and baler, also a curing and storage-house; but if followed up the same as other occupations, then I think the growing of broom-corn a very profitable business. Successful growers are made in the field by actual experience, not by teaching on paper. When it is grown in car-load lots (and it does not pay to grow it in less), broom-corn dealers will pay the cash for it delivered at the railroad station.

At five cents per pound and over, there is more money in it for the grower than the manufacturer at present prices. The latter has to be content with very small profits. A crop of twenty acres of good broom-corn, well handled, will pay for an improved farm of 160 acres here in Southern Missouri.

OUR HORSE MARKET.

BY DR. R. A. RAMSEY, MEXICO, MO.

In taking up the discussion of this subject, we feel it is one of greatest importance to the Missouri farmer and stock-raiser to consider: "What is the matter with our horse market?"

In order to make a systematic discussion of this question, let us consider it under three heads: What constitutes a horse of any breed? Where is our market for horses now? How shall we set about to supply this market?

1. What constitutes a horse?

When a mind examines any living form whatsoever, it always experiences a series of sensations which convey to it an agreeable or disagreeable impression. Thus it is the sight of a horse pleases or displeases us by the elegance of his form, the expression of his physiognomy, the vigor, the gracefulness of his gaits. Nature, like a book, manifests in everyone a sentiment of physical and moral pleasure, in proportion to the degree of special culture which the observer possesses. In ordinary language, everything that is in harmony or concordance is called proportionate; everything that is not so is disproportionate, although, in many instances, the arrangement of the parts is different. In this respect, it is plain that the type of a handsome draught horse approaches as near perfection, in its way, as that of a fine race horse. Both satisfy in the same degree, although in a different way, the requirements of the true connoisseur, for both are the expressions of a perfect adaptation to the end desired.

Proportions are then good or bad, perfect or defective, according as the subject in which they are found is well formed, correct in his lines, has a handsome form, beautiful symmetry, or he is in two pieces, inharmoniously constructed, wanting in form and symmetry.

Now, what do we mean by symmetry in the horse? Bourgelat says: "Since beauty resides in the fitness and agreement of the parts, it is very necessary to observe their particular and respective dimensions, and in order to acquire a

knowledge of the proportions, we must institute a kind of measurement which may be indiscriminately common to all horses."

Bourgelat takes the horse's head as the standard of measurement, and gives the following measures, which, according to our idea, constitute the foundation of the beautiful proportions of the horse's body:

1. Three and a half geometrical lengths of the head give the entire hight of the horse, counting from the top of the forelock to the ground upon which he stands, provided the head is well carried.

2. Three lengths of the head equal the hight of the body from the top of the withers to the ground; the length of the same body from point of shoulder to the point of the buttock inclusive.

3. A whole head gives the length of the neck from the summit of the withers to the posterior part of the poll, measuring in a straight line; the hight on the shoulders from the top of the withers to the point of the elbow.

The thickness of the body from the middle of the abdomen to the middle of the back.

The width of the body from one side to the other.

We might quote a great many more measurements from Mr. Bourgelat, but do not think it advisable. What we have given are sufficient to show there are certain measurements which, if found in a horse, indicate a certain symmetry and proportion of body which is not present in animals not showing the measurements. This lack of proportionate measurements is generally found in cross-bred horses, especially in crosses between heavy and light horses, which has a very great tendency to produce heads out of proportion to the size of the body, a body out of proportion to the size of the limbs, and *vice versa*. As the result of cross-breeding, we not only lose symmetry and outline of body, consequently style, but we lose conformation of limb and foot, and we gain a consequent tendency or predisposition to disease. It is a well-known fact among horsemen that a certain conformation of hock, known as the square hock or neat, round hock, is very much predisposed to spavin, being much more susceptible to strains than hocks known as the "wedge hock" (a good open hock wedging from above downward and from before backward), which cannot be spavined even with the severest tests or strains. Spavin is only a result of nature coming to the rescue of the weak part, or, in other words, a bone-spavin is only a small exostosis or growth of the bone thrown out by nature to help strengthen the weak hock incapable of doing the work required of it. But this little growth of bone generally causes very severe lameness, as it interferes with the action of the lower part of the hock joint. In this very brief and plain description of spavin it must be apparent to all that spavins are bred in the horse, not caused by use or abuse, but simply the result of nature coming to the rescue of the weak or badly formed hock, which has been bred there through the ignorance of the man making the selection of individual animals to be bred from.

The same thing, viz., bad conformation of limb, may be given as the chief cause for ring-bone and navicular or coffin joint disease. We nearly invariably see the horses suffering from these diseases are what may be termed "straight pasterned," *i. e.* where the horse stands too straight over his feet; or where the center of gravity comes too directly over the bones of the foot instead of on the back tendons, such as would be the case where the horse stands back further on the fetlock, thus giving him more elasticity or spring when the foot comes in contact with the ground.

Conformation of limb also applies to the knees. A good, broad knee in front wedging backward is not nearly so susceptible to become knee-sprung, as knees which might be termed round, and which give improper bearing for the tendons and improper attachment for the ligaments coming down from the arm, thus giving us a weak knee.

In the same way, horses with a straight hind leg are more predisposed to "stiffle" than those which are a little more crooked. Nor need we stop with the conformation of the limb as indicative of disease, but severe crossing between heavy, coarse-bone horses and the compact bone of fine-bred horses, gives us a bone much more susceptible to disease than bone of either one or the other of the above named classes.

It is unnecessary here for me to say much as to the heredity of blindness or periodic ophthalmia. We have talked on this subject before, a report of which appears in the State Agricultural Report of 1892.

Now I feel sure from my study of the nature and causes of disease, as well as from my personal observations in practice, that a very great amount of these diseases which are injurious to horses are bred with the animal and not generated, as many suppose. A good judge of a horse can tell at a glance a hock liable to become curb or spavined, a hind leg whose conformation is susceptible of stiffle, a knee liable to grow over, an eye predisposed to blindness, or a nostril indicative of weak respiratory power. It is astonishing in traveling over this country how many horses we find, even in the stud, who show all or many of the weaknesses. Is it then any wonder that we see so many buyers turn their backs on our horses and go elsewhere to make their purchases? How to remedy these evils is the question. We believe a great many of our best breeders have seen the error of cross-breeding between the different breeds, but whether the mass of people of this State who are breeding horses can ever be educated to a point of making better selection in individuals with regard to breeding disease, and bad conformation, is a question. We are inclined to think this education is too slow and expensive to the live-stock interests of the country. Would it not be better for us to follow the example of France, Germany, and some of our neighboring states in this republic, and pass a breeding law of such a nature as to suppress all animals for breeding purposes predisposed to disease, and such animals as can not be registered in their respective stud-books, and classed in some one class?

Such a law could be made self-operative—the nominal fee for the inspection and certificate going to pay the inspectors and other expenses. This would be a great protection to good and high-class stock, and the inferior ones would soon be pushed off to other states where they collect a service fee. Missouri has been a dumping ground for this kind of stock for some time, from Illinois, where such a law is in effect. I would urge on our legislators and those in power in this State, the detriment this inferior stock is doing to our live-stock interests, and especially our horse market. I hope they will, at no distant day, pass such a law as will cause this inferior stock to be passed on to Texas or some other place, or, better, have them "knifed" at home, and relieve the breeders of a long-existing evil.

There is no use of our sitting down and wailing over our horse market. The horse market is no worse than any other market for inferior stuff, but there is no doubt the sun has set on the plug horse, never to rise again; but it has also set on dried apples which are cured by being used as fly roosts for a month or two. But the day of evaporated fruit is in its bloom. So it is with our horse market. The market for high-class horses, saddlers, drivers or coach horses is as good, if not better, than ever it was. But for the reasons we have mentioned, viz., errors in

breeding, our high-class horses are scarcer than ever they were. I am credibly advised of this fact by men who are looking for this class of horses. So long as we see Canada supplying so many saddle, coach and draft horses to our eastern cities, even in the face of a very high protective duty, we should not complain of our horse market, but try and devise ways and means to supply our customers with the kind and class of horses they want.

As stock-raisers, we must keep pace with the times and cater to the fancy of the consumer and give them what they call for. If we do this, there is no more remunerative branch of farming at the present than raising horses.

It is an old and true saying that experience is the best teacher, but a very expensive one. The truth of this axiom can be verified by our horse-breeders of Missouri. True, our trotting-horse men have made very great strides in the way of producing speed and reducing the world's record for trotters and pacers, but they have done so at very great cost both to themselves and to the country. In their eagerness to breed speed they have overlooked every quality, symmetry, size, bone, conformation of limb and predisposition to disease. In their selection everything else was overlooked if the horse could go fast. Now, what is the result? Past experience has demonstrated to us that about one trotting-bred colt in a hundred goes fast enough to distinguish himself. Thus the breeder finds himself stocked with a lot of horses not fast enough to be valuable, and either too small, ill-proportioned or unsound to sell or be used as gentlemen's drivers, surrey or carriage horses. And as the consequence of this we see this latter named market going begging for horses.

But our trotting-horse breeders are not the only ones who have made mistakes. While Clydesdale and Percheron horses are good in their place, they have been very much abused by attempting to cross them on light-boned horses, and thus proved a very great injury to our horse interests. I think probably the Percheron horse has proved a greater detriment to us in this respect than the other draft breeds. They were largely imported here, and represented as just what we required to cross on our mares to produce what is known as the "all-purpose" horse. But being a hybrid breed of horses, and not possessing sufficient stability of character to reproduce themselves in crossing, they proved an utter failure in this respect.

The day of the "all-purpose" horse is past. There is no such a class of horses, and the sooner breeders become aware of this fact and cease trying to breed such a horse, the better for themselves and all concerned.

Had we not better, then, when we want to improve the individuality of either our heavy or light horses, or any breed of them, to breed in line as Bakewell did when he was improving the Short-horn cattle, and bringing them up to their present high standard? He did this, not by throwing in a strain of Hereford, Galloway or Jersey, but by selection of individuals in Short-horns. If we will follow Bakewell in his principles of improving Short-horn cattle, English cart-horses and Southdown sheep, and breed a pure-bred animal, paying the greatest attention to proper selection of individuals, as regards size, quality, symmetry and conformation of limbs, it will follow as sure as night the day that our horse market will be greatly improved.

GOOD ROADS.

BY H. ROHWER, C. E., SEDALIA, MO.

I greatly appreciate the honor bestowed upon me by the request of the Board of Agriculture, through its Secretary, Mr. Rippey, to appear before this assembly in behalf of good roads. I am sorry only that the choice has fallen upon a man who. though willing and anxious to assist in this work, must, however, confess his inability to add anything that has not been presented to you before, and this by men more able than myself. Yet, while the question under consideration here is of vital importance and one that is concerning us all, I have accepted the invitation and find it a pleasant duty to be with you.

Trusting to your indulgence, I hope to have the satisfaction of seeing some suggestions of mine receiving your kind consideration, and should I herein succeed, my endeavors would be richly rewarded.

We are dealing of late with mysterious and invisible forces, produced and transplanted by currents through the air, acting in a manner not understood even by the men handling and directing them; and while they may experience their great influence, they nevertheless are only guessing at their actual state or form.

Should not this move for a betterment of our roads be ascribed to one of these invisible mediums fascinating human thoughts and mind? Or is it a germ that is creating this disturbance so general over the broad land of ours from the east to the west, from the north to the south, defying the greatest of human genius to control its influence and hold in check its progressive tendencies?

Let the cause be what it may, we all know that the influence exerted by it is for good, and we hope will not permit us to rest with achievements made on rail and water, and so neglect the common roads, the "needs at home." Good roads save time in travel, increase inter-communication between cities, towns and the country, will revive trade, reduce the expense on hauling freight, bring a greater net profit to the producer, and at the same time enhance or raise the value of his land. Good roads have the further advantage to the farmer in permitting him to haul to market his products at a time when most convenient to him, and at a season of the year when farm labor otherwise cannot be performed, and the horses and men would be idle.

We have shown to the world at large, by the great exhibition just closing its gates, that we are marching alongside if not in advance of our mother countries in Europe in the progress of life, in the advance of science and the elevation of the human mind: why should we remain behind them in the daily wants that are so essential to education and civilization? And yet we must confess that we are away behind them in this *one* respect, at least, that we have greatly neglected the improvement of our common roads.

This evil is not a local one, is not confined to a single township or two, not to a single county or state. It is almost universal; it reaches all over the land of America, irrespective of nations and tongues; and keenly must it have been felt by every lover of our country, which we all know to be the soul of America, when conducting the foreign brethren through the agricultural department, point out to them with pride the greatest display of farm products such as no other country can equal nor will attempt to exhibit; and when then the thought strikes us, if I shall not say the reproach, that we are so far behind them in furnishing our farmers with roads by which they may be enabled to haul to market the products that have created the great wealth of the country, and have earned for it a world renown.

Shall this state of affairs continue to exist? Our State has decided to the contrary, and the brilliant sun-light of advancement arising over the eastern horizon is thundering "no." This is a nation's voice, clothed in the nation's colors, and has adopted a name that is "National."

This thundering voice has sounded at the door of our capitol, has made itself heard through the International Good Roads Congress in Chicago, and is now inviting all the states to place themselves under its banner. For what purpose? To foster and care for them, and with their assistance to be enabled to show to the world at large that we are ready to enter the arena with them for competition, make known to them that our patriotism has risen to fever heat, and nothing less than a share of comfort for ourselves and the acknowledgment of the people at home and abroad will satisfy our nation's pride in accomplishing what we have undertaken to perform.

The ball for improving our roads has been set in motion; may it never cease rolling until it has passed over every road in this broad land of ours, and above all do I wish that our home State would do itself honor by pushing it along heartily, so we may, at a no distant day, be leading our sister states, and become the shining star of this continent in this respect, as it will be in others.

And when I asked myself the question, how far I may be able to assist you, considering that I have accepted the invitation to deliver an address on the subject of good roads, and am here appearing before this assembly, that is free from all political strife or antagonism, consisting of gentlemen whose sentiment is pure and unselfish, meeting with each other upon one common field of labor for the welfare of others, sacrificing their comfort so they may be able to save others and the generation to follow, when considering this I become embarrassed, for, as I stated before, I can offer nothing that has not been said on this floor by wiser counselors than I am, or that has not been written in our road periodicals, published in pamphlets or books, or spoken in open meetings time and again. But should I finally succeed in presenting to you a few facts of interest, do not credit them to me as being my own productions or discoveries; they are but borrowed, either from nature or men.

One of our professors used to remark, when treating on new inventions, "that there was nothing new under the sun, it only appeared in different forms;" and so it is here. What I may relate to you here is old, and has been brought to light long before my time. What I shall endeavor to demonstrate to you here today are old familiar laws of nature for centuries known to exist; our present age is accredited only with a more correct conception of the same.

In our dealings with the improvement of common roads, connecting farms with each other and with cities, we may meet with different materials, as earth, clay, sand, rock, etc., but common to all we will find the same two main factors hindering our transports, and they are grades and friction, both of them tendering an influence that is evil, and which to overcome and remove entirely we will never be able to do; but we have power to diminish it. And as we succeed in reducing them to a minimum, the greater will be our road improvement, the nearer will we approach the state of their perfection.

To make plain the influence of a level road, or rather one nearly so—for a dead-level grade, though carrying with it many advantages in hauling freight, is detrimental to the maintenance of the road, and will therefore never receive recognition—in other words, in showing to you the importance of light grades over ones much inclined, I only need refer to your own experience when hauling your freights over same, when the horse expresses to you in a language easily under-

stood, that the steep hill is taxing beyond his power, or that his strength has become exhausted. The farmer in hauling his product to the market commonly figures on hauling a load that can be pulled by his horses over the steepest hill he is to encounter. Should there be not one steep hill, but many of them, the horses will become fatigued long before the time ordinarily to be calculated on, and the more the hills the less the load that can be hauled over them.

How this is to be proportioned I will try to demonstrate to you. Friction, with but little variation being common to all roads, whether level or inclined, will, therefore, not receive consideration at this time, where we are treating on grades in their relation to each other.

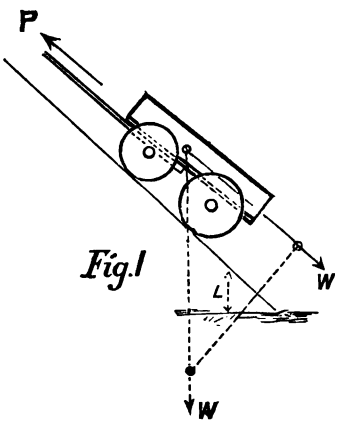


Fig.1

The power ("P") required to pull a wagon the weight of "W" up an incline, the angle of which with the horizontal may be designated by "L," must be more than the resisting force, which in this case would be "W"×"L;" or, in other words, the force required must be more than the weight of the wagon and its load, multiplied by the sinus of the angle at which the plane is inclined. The steeper the plane, the greater, therefore, the angle of its inclination, the greater the resistance in the proportion here given, and this will coincide with the results obtained by numerous and carefully conducted experiments, based upon scientific principles and compiled in the following table. If a horse is capable of pulling a certain load, say 68 cwt., on a smooth horizontal plane, at a speed of 3½ miles per hour, under otherwise the same conditions he can draw, if the incline be:

Sine.

1 foot in 500, but	41	cwt.
1 foot in 250	38	"
1 foot in 80	28	"
1 foot in 60	25	"
1 foot in 50	22	"
1 foot in 35	18	"
1 foot in 30	16	"
1 foot in 24	13	"
1 foot in 20	11	"
1 foot in 18	10	"
1 foot in 16	8 5	"
1 foot in 12	5.7	"
1 foot in 10	4.2	"

The useful or mechanical effect, however, shows a result still more visible. Assuming, for instance, the speed of 3½ miles per hour with a man and wagon weighing 11 cwt., then we have:

At an incline of 1 foot in 500, 41 cwt. total, minus 11 cwt =30 cwt. net.
At an incline of 1 foot in 250, 38 cwt. total, minus 11 cwt.=27 cwt. net.
At an incline of 1 foot in 20, 11 cwt. total, minus 11 cwt.=0 cwt. net.

Or the horse ceasing pulling anything beyond the empty wagon with the driver unless forced to extra exertion.

It is not wise to make the road so steep that it will not permit the wagon to stand thereon without danger of its rolling down hill by its own gravitation. If the distance is but short (say from 400 to 500 feet), a good-sized load might yet be hauled up a grade of five feet in 100 or one foot in 20; but this should be considered the maximum on any well-established road. But why do I mention a dis-

tance not to be above 500 ft.? In considering this we have come to another factor to be observed in the establishment of grades on our roads, and that is the distance that is to be overcome, or in other words, the length of the incline to be used, bearing in mind that the team can only work a certain length of time at the full

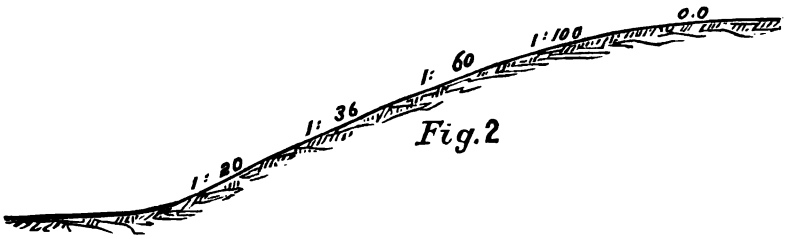


Fig. 2

application of its power; it will then relax, and finally cease to exert any strength at all. This renders it necessary that the grade should diminish after reaching a certain length, thus giving to the surface a line in appearance like that of a parabolic curve; or the grade must be intercepted by offsets, and receive resting places in the manner shown in Fig. 3. This latter will somewhat destroy the beauty of its appearance, but it will serve the further purpose of intercepting the flow of the water and enable its draining to the sides,

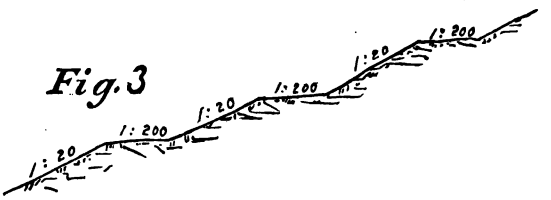


Fig. 3

and in doing so, prevent it from washing the road-bed. If light grades cannot be obtained on a straight line without incurring great expense by introducing heavy cuts and fills, it is well to locate the road so that it will encircle the hill, or overcome the difference by gradual ascents or descents, following thereby the contour of the country.

To obtain an easy grade at the least expense forms an essential part of the duty of the locating engineer. And to obtain this, valleys may be followed with great advantage, as is the case with railroads, or divides as was done by the Romans.

But the grade is not the sole agent governing the location of a good road; another factor is to be considered alongside with the grade, and that is drainage.

The drainage is for the purpose of keeping your road dry, and is of as much importance in the maintenance of the road as light grades are in the construction of same. The road should, therefore, be so laid as to give or allow the sun and air a free action. It must not intercept swampy or marshy land if this can be avoided, and cross as few creeks or rivers as can be arranged for. Should, however, wet or retentive soil be met with, underground drainage must be then provided for before material be hauled over it that is to form the road-bed. Drainage can be obtained by simple cross-drains placed at certain intervals as required, or by a combination of cross and longitudinal drains intercepting—the cross-drains to be of such dimensions as the soil and conditions may require. These trenches being constructed for the purpose of drawing and gathering the water from under the road, they must be protected from becoming clogged, and this is being done by either filling them up with brush or broken stones (trench drains), or by laying therein drain-tiles, whereby the water is being conducted to the sides into larger ditches, that are to convey the water into the nearest water-course or ravine.

In the latter our road-builders oftentimes fail—not only the supervisors of our common country roads, but also the engineer in building the railroad. Standing

water alongside the road is detrimental not only to the road but to the land adjoining it; and I may say right here, in framing a law governing the construction of highways, it should not be overlooked that the road supervisor be empowered and authorized to dig ditches across the farm land if this should become necessary for the proper drainage of the road. Cross-drains may be arranged also for conducting the water across the road; in this case they will have to carry larger bodies of water, require, therefore, larger openings, and its construction changed accordingly.

SUB-DRAINS BY PIPING THE ROADWAY.

Sec. 1, Fig. 4, shows arrangement for longitudinal drains, if such be necessary.

Sec. 2, Fig. 4, shows plan of road-bed. Longitudinal drains "aa" are placed near the curb-stone "bb," one on each side of the road-bed, in the manner shown, the water collecting therein being conducted to the sidedítches by intercepting

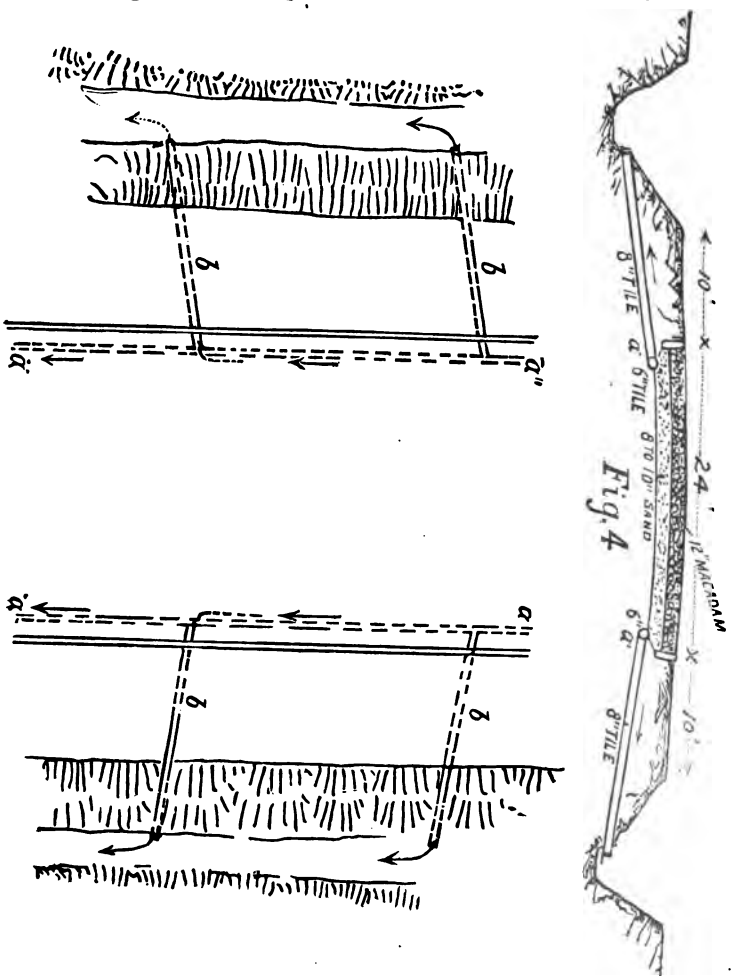


Fig. 4

drains "cc," which may be placed 50 to 100 feet apart, according to the nature of the soil. The minimum fall should be one ft. in 200, and the maximum fall one in 30.

Should the latter be such that longitudinal drains would not necessarily be sorted to, single-pipe drains, placed across the roadway in the manner shown in Fig. 6, will oftentimes answer the purpose. Drains must not be cemented together, but left free, and no stone should be placed under the joints. To save them from the action of the frost, they should be placed below the freezing line, and their depth, therefore, is governed by the locality in which the work is to be done.

Fig.6

If deemed advisable, several pipes may be laid alongside each other, as shown in figure 7. The longer the drain, the greater shouldbe its capacity.

Fig.7

In employing small drains, care must be taken that they are kept open; for that purpose woven wires are placed at the opening to prevent craw-fish, etc., from entering and clogging them.

CULVERTS.

Culverts are inserted for the purpose of conducting the water across the roadway from one side to the other, and used in places where the quantity thus to be conducted is but small.

Culverts may be made of pipes, iron or earthenware (sewer-pipes), or of stones; but whatever material may be employed, great care should be exercised in its selection, as well as in the placing of the same; for renewals, when required, render it necessary that the paving be torn up, thus damaging the road-bed and surface. And should it happen that the culvert is located under a heavy fill, the work of moving and replacing material will be another item of importance to be considered, and should be avoided if possible, or at least reduced by placing there a structure that bears with it the qualifications of substantiality and durability.

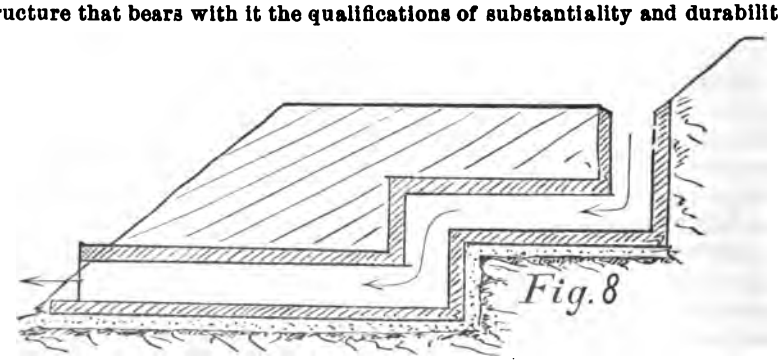


Fig.8

Should the road be located on a hill-side, and a culvert on continuous grade cannot be built conveniently, an arrangement in the manner shown in figure 8 may be employed with advantage.

We all know when we are crossing streams and other ways of some consequence, bridging will have to be resorted to for spanning them, and our many bridge companies or private builders will plan and erect them for us, suiting our taste and the funds appropriated for that purpose; but when the road-bed is to be secured against the evil influence of the water within it, or what falls on the surface of same, and for which no certain rule can be laid down, since the soil to be dealt with varies with nearly every field, it requires close observation, and a man with keen apprehension and a full knowledge of the surrounding circumstances, to guard against it.

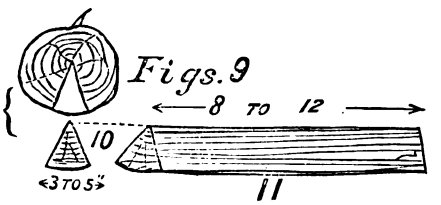
Varying this with the different localities, it must be carefully examined into by the engineer locating the road, and he will take for his guide the topographical and physical condition of the country; and these are some of the factors rendering it, oftentimes, necessary to remove roads from section lines to places better adapted for same.

If we further consider the advisability of intercepting layers of stone or other material, such as will become available and may become necessary in constructing the road, bearing in mind further that low valleys are not to be followed for any length of time, rivers to be crossed as seldom as possible, side hills to be avoided where slides may set in, and many other points to be observed (too numerous to mention here), then we see it is impossible, at least almost impracticable, to lay down a road on paper or field without due examination into its adaptability for same on the ground; and I must mention here, again, what I said at the State Road Convention when in session in Sedalia in January last, that the duty of the engineer, before designing his system of roads, is to first complete his county maps by indicating thereon the different cities and towns, the respective density of the population in the county, the acreage of land under cultivation, all the water-ways, whether natural or artificial, all railroads, bridges, culverts, and, what is of great importance to know, as we have seen before, the topographical lay of the country and the location and extent of all strata or layers of stone or other deposits valuable in the building of roads. With this information at hand, the engineer may proceed with the work of laying out his roads, and, should he encounter obstacles on field, unforeseen, he will be able with very little trouble to vary his plan so as to avoid them.

After this has received due consideration, and the lines have been laid down for the different roads, then the grading may be commenced; and here I will but mention a few facts to give more time for the more important part, the surfacing. When grading a road, never allow perishable materials to enter the embankment; make your layers horizontal, thin, and of equal thickness; tamp or roll your ground well, protect your slopes from washing by either sowing grass on same, or making offsets.

To improve the surface by supplanting the natural earth by other material more solid was known to the Romans, the first road-builders of whom history makes record; in proof of which have a sample of remains of same on exhibit in Chicago, in the actual state of their construction. Other nations may have preceded them, especially when we consider their wonderful achievements in other lines, as the water supply of Carthage, the hanging gardens of Babylon, the water-works and sewerage of the temple of Jerusalem, the art of masonry and building in Egypt, of which a thousand witnesses are preserved to the present time (among them chiefly the Pyramids, which could have never been built had they not provided for hard and smooth-surfaced roads over which these gigantic masses of rock had to be hauled); and when we finally come to consider the Greek race, whose art and accomplishment in architecture has never been excelled, nor very likely ever will, and of which the Romans, like us, but borrow, must we not assume that they also had advanced in the building of roads? Certainly we must. I, however, shall only relate to these roads that we have proof of as having been actually built, and their structures revealed to us by remains of same. Some of their roads were built more than 2000 years before our time, and when we closely examine the structure of same, we will discover that but little, if any, improvement has been made therein these many centuries.

The old Romans, when not yet supplied with axes or other sharp-edged tools, or for other reasons not known to us, sawed off logs in lengths of 8 to 12 feet, split, or rather clove, them into forms shown in Figs. 9, 10 and 11, most easily obtainable through the aid of wedges. These rough-shaped pieces of timber were then laid alongside each other in such manner that the thin parts of one piece would overlap and cover a part of the heavier end of the other piece and held in place by a third stick placed over it longitudinally, and fastened by wooden pins, as in Fig. 11. This kind of a rudely constructed road, no doubt, was used only where there was an abundance of timber, and on soft ground. A piece of this kind of road was recently (1892) uncovered in Germany, and placed on exhibit in the Transportation building at the World's Fair. We have the assurance, however, that they did not stop at this primitive art of road construction, since other roads of theirs of a more permanent character have been found all over western and northwestern Europe, and in an especially well-preserved state in England, France and Germany. Though built nearly 2000 years ago, they still maintain a good condition that is wonderful in the extreme, and are like the famous Cloaca Maximava in the city of Rome, built by them about 600 years before Christ, serving the purpose up to date.



Figs. 9

Fig. 12

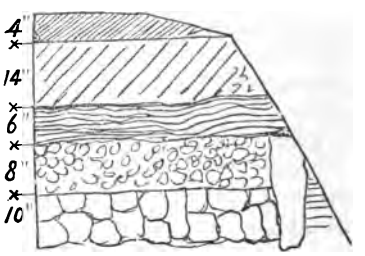


Fig. 13

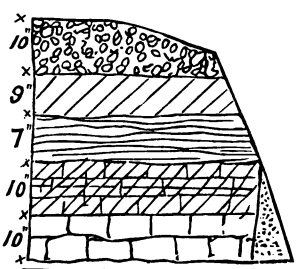


Fig. 14

The Romans had a practice of mortaring the surface, indicating thereby how well they understood the advantage of good drainage, and not permitting surface water to enter into the structure. If I do not occupy your time too much, I should like to explain to you in short the manner in which they proceeded to construct those roads that are still good at this day. Should their road lead alongside a hill, they oftentimes would resort to solid masonry in the form of retaining walls to secure for same a protection against slides. (See figure 16.) The French and Austrians had a system in vogue as early as 1650, which demands mentioning as being the first ones to follow the Romans after centuries of stand-still. The construction then employed was in a manner about like that shown in figures 16½ and 17. This kind of pavement we find in use as late as 1700.

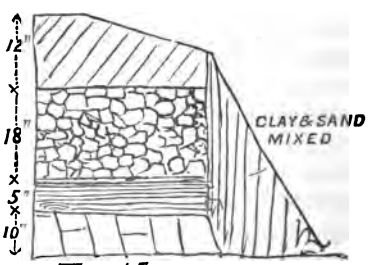


Fig. 15

In Germany (Austria) was a man by the name of Schormel, who at about the same time advocated and introduced his system of road-building there, performed in the manner which is more complete, on account of the introduction of the arch for better drainage. (See figure 18.) He was followed in France by Fresaguet in 1775 to 1800, and in England by Macadam about 1811, both famous as road-builders.

The latter it is whose name has become familiar all over the world for his system of building roads, which is by far not as substantial as those I have just shown you, built by his predecessors; but the good service it is rendering at such a comparatively small cost has made it famous, so that it has not only been adopted in England but all over Europe, and I might extend it still further and say all over the world.

At the same time a second man rose in England, whose name has become so intimately connected with that of Macadam that the modern conception of a good road is a combination of the two, and is often called a Telford-Macadam.

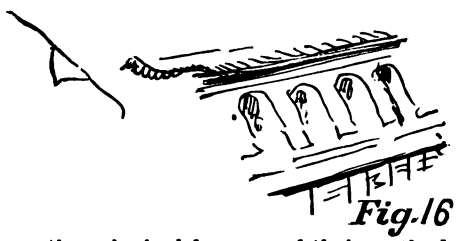


Fig. 16

While Macadam believed in building up the entire surface of the road by small broken stones, Telford advocated stones for the bottom layer. These are the principal features of their methods. The details of the construction of these roads, I will refer to later.

While Macadam roads are still maintaining the lead for suburban and country roads, in cities, however, where the traffic is heavier, or where smooth surfaces are in want for more comfortable driving without submitting to the dust caused by the Macadam, different pavements have been introduced, according to the traffic they will be subjected to.

Stone pavements, built of stones, cut square, six to eight inches in length, set upright on a layer of soil of concrete, used only on streets of a steep incline or of heavy traffic. They are hard on vehicles and teams, and while more expensive than others, are of a longer life.

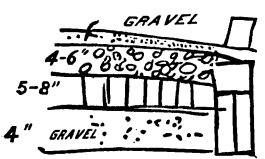


Fig. 18

Brick pavements are comparatively new, having been in existence for only about 40 years, and where subjected to but light traffic have shown good service. There is a brick pavement laid in western Germany (Holstein marsh) as long ago as 50 years, used now as a turnpike, which still retains its good condition. Other brick pavements, however, in Kansas City and other places in our country, have resisted the traffic but three to four years, and the longest guarantee we could obtain on a street that had to be paid for by our company, and is just approaching completion, was five years, while it might last twice that long but no longer.

Bricks are laid edgeways, either on boards or on flat laid bricks with a sand cushion, or on concrete. The latter method is a little more costly but more durable.

Wooden Blocks.— Wooden blocks are cut in lengths of six inches, varying in thickness from three and one-half to eight inches in diameter; they are set in a sub-pavement consisting of either sand, boards

Fig. 17

or concrete, and are especially adapted for a light travel and a dry climate. They bear with them, however, the difficulty of keeping clean, owing to the tenacity with which filthy matters of all kinds will adhere to them. And the exhalation arising from the absorption of fluids renders them an unsanitary pavement. Wooden blocks further are short-lived and require frequent repairs.

Fig. 19

Asphalt has many good qualities, and could it be obtained and found in larger deposits in our country, it would receive much greater recognition and be more liberally used. Asphalt furnishes a smooth hard surface, is impervious to water, and keeps clean. It is however, slippery, especially in the winter; is subject to changes of temperature, therefore short-lived; and it is expensive.

Asphalt is being applied as a coat over concrete or broken stones.

Macadam.—This system, with or without the Telford sub-pavement, is now being generally adopted on all first-class country roads or the so-called turnpike. It consists of layers of small broken stones through the entire depth of paving, without any admixture of earth, gravel or sand. Nothing is to be laid under the stones in the way of foundation, nor anything to cover them with the pretense of securing a binding. The stones to be used must be small, passing through a ring 2 to 2½ inches in diameter, of uniform size, crushed or hand-broken, of a hard limestone, basalt or granite rock, and put on the road in layers of 4 to 5 inches, heavily rolled, so as to compact them as much as possible.

Telford maintained that the bottom layer should consist of larger stones, set upright, with the heavier end downward and closely jointed. See Fig. 19.

These stones need not be of very regular size nor of such select material as required in macadam. The size of the stones is about 3 to 4 inches square at the base and 5 to 6 inches high. Over these stones should be broken and tramped in between, the smaller ones in the shape as described by Macadam. The more solidly they are compacted into and with the layer of larger stones in the bottom, the better will be the roadway. The small stones should be placed in a layer of from 5 to 7 inches thick, in the manner before described, and heavily rolled.

On top of the small stones for surfacing, is generally spread a thin layer of fine screenings for the purpose of a closer packing, wetted and heavily rolled.

Iron Rails.—Oftentimes iron rails have been advocated, and actually employed as tramways in the lower districts, what plank or slide roads of wood are now performing in the mountain districts. These iron rails are being placed on ties or sleepers, in a similar manner as on railroads, only that the rails are lighter, and likewise the ties on account of not being subjected to such heavy traffic, and when properly provided with flanges and fastenings, will greatly increase the facility of hauling freight.

But when considering that the part lying between the rails must be paved anyhow to provide a foothold for the horses, if the balance of the roadway is not receiving a like treatment it will leave this part in a deplorable condition. Unsightly in appearance and costly in maintaining, they will not likely be considered for general adoption.

COST OF PAVING.

The prices paid for the different pavings vary with the locality, and depend upon whether the material to be used is close at hand or not; upon the kind of soil to be encountered and the sub-pavement applied. This accounts for the range of prices given below:

Stone block (granite) per yard	$2 00 to 2 75
Stone block (sandstone) per yard	1 65 to 2 25
Asphalt per yard	2 25 to 3 00
Wooden blocks per yard	1 50 to 1 90
Bricks per yard	1 70 to 2 10
Macadam & Telford per yard	65 to 1 10

And their lives may be assumed at:

Stone block (granite)	50 years and longer
Stone block (sandstone)	30 to 50 years
Asphalt (surface)	5 to 15 years
Wooden block	5 to 8 years
Brick	5 to 40 years
Macadam & Telford	10 to 20 years

Depending upon the climate partly, but more so upon the amount of freight hauled over the same.

Considering the pavements in the light of practical use for hauling freight, they compare with each other about as follows:

If a horse can pull a load over a road of dry and loose sand, he can pull

8 times as much with the same force over dirt road.
4 to 6 times as much over cobble-stone pavement.
6 to 8 times as much over wooden blocks.
8 to 12 times as much over Belgian blocks and Macadam.
20 to 25 times as much over asphalt.
30 to 40 times as much over iron rails.

I might go into the details of the construction of the different roads here outlined, but this would occupy too much of your time, and is not in place.

There are only two methods by which the highways of our State or any other State can be improved, and they are, either by spending more money on them, or by using the present expenditure to greater advantage. While the latter is thoroughly necessary, would the former be desirable? We have many enthusiasts on highway improvement that are of the opinion that a certain proportion of the annual expenditures on roads could be used in building highways. This cannot be done in a justifiable manner, and, repeating a phrase of the English News, "it is like keeping on patching rope harness until it becomes a leather harness." It is true that the money spent now on roads is largely wasted, but this is mainly due to the manner of electing the road overseer, and the way in which the road taxes are worked out.

To inaugurate a good system of highways, turnpike or gravel roads that shall become a blessing to the community at large, and the farmers in particular, you must follow a certain system similar to the one I have outlined. And, the farmers not being able to bear the expense of building them, the State should take hold of it, or better the county, with the State guaranteeing the bonds—the bonds to run a certain length of time, say 20 or 30 years, and the farming district through which the turnpike is to be constructed be taxed with one-third its cost; the district to embrace, say three miles on each side of the road, and the land nearest to it taxed the heaviest. If the farmers will then spend as many days on the road as they are forced to now, they will be able to earn more than the taxes amount to; besides this, they will be able to dispose of the stones covering their fields—break them up in rainy seasons or cold weather and sell them to the authorities, making money instead of losing any, and besides having the comfort and advantage of the good roads.

I believe if the farmers are permitted to work under a system like this, the county would soon have enough applications come in such number from different

districts that, to keep the expenditure within the limit of the law and the safety of the county's finances, that the special tax must be raised, and the farmer be made to pay one-half instead of one-third the cost. Even assuming there would be no income to the farmer in the building or improving of public highways, the comfort of travel, saving of time, hauling of heavier loads to the market at any time of the year, whenever the prices are high or when it suits his convenience, less tear and wear on the vehicles, and the increase of value of his land lying abutting upon or within a few miles of such road, will greatly repay him for contributing his share to the cost of the same.

Follow my advice and not build any more turnpike or gravel road, however, than is thoroughly necessary, and only then where the traffic and the circumstances, as outlined by me at the beginning, render them beneficial, and where the location is such that they can be constructed cheaply; but do improve all your earth roads in a systematic manner at once, under proper supervision; diminish the grade on same, and gravel the surface of the more traveled ones whenever such material can be obtained within easy reach.

At the National Farmers' Congress held at Lincoln, Neb., in November, 1890, it was stated that economical road improvement throughout the country would result in an annual saving of $250,000,000 in the handling of products alone; while the Massachusetts Highway Commission, as the result of careful examination, puts the annual loss to that State alone, caused by bad roads, at $5,000,000, and further says that this sum, properly expended, would put all the principal highways of Massachusetts in good condition. Scientific road construction costs less than the building of a bad road, and the maintenance of the properly constructed road really amounts to far less than the sums annually spent in the attempt to make bad roads passable. With these conditions, the truth of which no intelligent investigator can deny, it is high time that the farmers, who nominally make the roads and actually use them—that is, when they can—should awake to a realization of these facts that have a most important bearing on their own interests.

Mr. Pope's move to have a branch Bureau of Public Highways established is a correct one. A bureau of this kind, confined to one department, is much needed, and should receive the indorsement of all roadmen and farmers. (May the assertion "that he is seeking thereby his own ends" be ill-founded, and if his hard labor and work for the betterment of roads prove that it is the welfare at large he has at heart, his name will be washed from all blemish, and he receive the honor due him for his trouble and hardships in its behalf.)

While there are many farmers of intelligence and in possession of a pride to better their condition, there are just as many, if not more, who will resist every move in the direction here under consideration.

It is eminently proper, therefore, that the Senate committee which was appointed to investigate the general interest of this class should not neglect to seriously consider the question of improving roads and its effect upon the agricultural districts; and their verdict, says the "News," whatever it may be, should be based upon the fullest data and most careful investigation, and when made should be given the widest publicity. Thus the public will receive information of a reliable nature that will not only enlighten them, but will arouse the people to the necessity of improving their roads, and thereby become a national benefit.

TILLAGE.

BY G. W. WATERS, CANTON, MO.

I. Seed-Bed ..... Deep or shallow plowing.
II. Admit Air ..... Disintegration-root area.
III. Regulate Moisture ..... Capillarity.
IV. Kill Weeds ..... Agricultural highwaymen.

In this arrangement of the subject for analysis, I make no effort at a logical statement, but rather to follow the operation of tillage much as it would occur in actual practice.

In the preparation of the seed-bed, the first thing to determine is the depth to plow. Much discussion has been had at this point. Deep plowing has been by far the most popular idea; but experience has shown somewhat contradictory results. Our own experience is always valuable, because any lessons learned in that way are strongly impressed upon our minds. The experience of others is valuable unto us in the ratio of their accuracy. We find the recorded experiences of experiment stations especially valuable, because one single principle is sought to be determined at a time; all disturbing factors are removed or accounted for. For there are many seemingly contradictory influences—"truth opposed to truth"—and we shall find instances of this kind in the discussion of this question.

I call attention, then, to the resultant yield from different depths plowed, all other conditions being the same, the only difference being in the depth plowed:

TABLE I.

N. Y. Experiment.

Plat.	Depth.	Yield.
1	30 in.	50
2	24 "	38¾
3	18 "	42½
4	12 "	35
5	6 "	45⅞

TABLE II.

1890.

Plat.	Depth.	Yield.
1	Disc	56.4
2	2 in.	59.9
3	4 "	69.4
4	6 "	69.3
5	8 "	71.7

TABLE III.

Ills. Experiment. 1891.

Plat.	Depth.	Yield.
1	2 in.	54.0
2	5 "	57.5
3	10 "	56.0

TABLE IV.

1890.

Plat.	Depth.	Yield.
1	4 in.	42.8
2	8 "	33.1
3	10 "	35.3
	Second Trial.	
4	4 in.	49.1
5	10 "	47.0

(*Missouri Experiment Bulletin 14.*)

Plowed 7 inches; subsoiling 12 inches; subsoil stirred 5 inches.

TABLE V.

		Corn.	Rutabagas, lbs.
1889	Subsoiled	57.3	23,000
	Not subsoiled	57.3	25,965
1890	Subsoiled	55.0	24,950
	Unsubsoiled	55.5	22,930

TABLE VI.

METHOD OF PLOWING.

Plat	Method.	Yield 1889.	Yield 1890.	Averages.
1	Lap furrow	39 4	31.0	35 2
2	Cut and cover	41.3	32.9	37.1
3	Not plowing	43.3	28 7	36.0
4	Ordinary	41.3	33 1	37 2

In Table I the deepest preparation brought the greatest yield, but the shallowest brought the next greatest. In Table II, for the year 1890, the suggestion is that the yield increases as to depth plowed. But in 1891 the conclusion is changed, for the 5-inch plat is ahead.

Table IV would point to four inches as the proper depth. But it will not do to depend upon one experiment.

Table V indicates no value whatever in subsoiling. You remember a few years ago the "subsoil craze" swept over this country. It may have merit in some instances. It is almost a thing of the past, however, and need not be discussed here.

Table VI is somewhat enigmatical. It is explained that the "lap furrow" means that the plat was plowed with a 12-inch plow, cutting a furrow slice eight inches wide; the "cut and cover" was plowed with the 12-inch plow, cutting 16 inches, leaving four inches unplowed; the "no-plowing" plat had simply holes dug for planting the corn; the "ordinary" was aimed to be done about like the average farmer does.

A study of these tables leads us to a "conclusion in which nothing is concluded," hence there is room for much discussion (and many a good newspaper article). Later on in this discussion I hope to show the "why" we have such varying results—sometimes better from deep and sometimes better from shallow. Prof. Morrow, of Illinois, said: "Deep stirring of the soil (plowing) in preparation for the crop (corn) is not necessary."

Upon one question all are agreed: so deep as you do plow, the soil should be thoroughly pulverized to the depth plowed, for several reasons:

(*a*) The most unfavorable condition in which the young plant roots can be placed is in a lumpy, cloddy soil. The small, flexible roots, while they have great power to penetrate the earth, being provided with a means for penetrating the soil, as if you were to try to push the point of a switch into some substance, holding it at a distance from the end, it would bend, whereas, if it is grasped close to the point, the sides being supported, it could be pushed into the substance with considerable force. So when young plant roots reach a clod, more or less of open air spaces being around the clod, the root would fail to penetrate, but would bend around it.

(*b*) Again, the feeding "mouths" (?) of the roots are along the sides, near the ends, in the form of "sucking cells," by which means they obtain their food from the surfaces of the particles of soil. It is evident that the finer the pulverization the greater the amount of feeding surfaces or root pasturage in a given area. For illustration: a three-inch cube would have nine square inches to the side; six sides equal 54 square inches of surface; break this cube into one-inch cubes—result, 162 square inches of surface. So the feeding surfaces may be multiplied infinitely by pulverization.

(c) As a further consideration, I note: the ground when first plowed lies loosely and full of open air spaces to the depth plowed; the air circulating freely through it dries it out rapidly; hence the first effect of tillage is uniformly to cause the ground to dry out. This is true in every case, varying in degree as to the depth stirred and the condition in which the soil is left. In a continuation of tillage until thorough pulverization is reached, the resultant effect is to prevent drying out. Thus two opposite effects may be produced by the same process. These two principles (opposing forces) are as true in cultivation of crops (interculture) as in the first breaking of the ground in spring or fall. It is often forgotten or not recognized by the farmer, that in "plowing deep to bring up the moisture" in corn culture, the operation does bring it up and out. He plows his corn deeply, leaving it loose and exposed to the drying influences of air and sun; whereas, close, fine pulverization of surface would have kept the moisture in a large degree from escaping.

This brings us to a consideration of capillary power, a condition in the earth's surface causing an upward flow of water. This force is constantly at work; water goes down into the earth by gravitation; a portion adheres to the particles of soil, is held in suspension, but it is acted upon at once and constantly by capillary force, and caused to ascend. Reaching the open air, it is caught by another force, evaporation, and goes away. Some soils and subsoils, and some conditions of soil, are much more favorable for this upward flow of water than others. By actual test it is learned that closely compacted soil is favorable to this upward flow, while a finely pulverized looser surface is unfavorable. Recognizing these principles as true, a practical suggestion would be to so prepare the seed-bed as to allow the upward flow to reach within a few inches of the top of the ground, where, if arrested by the pulverized soil, the moisture is available for the use of the seeds to be planted.

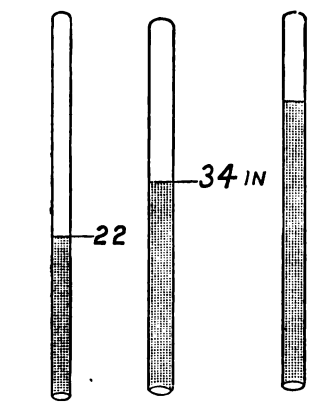


Fig. 0

Frequent experiments have been tried to ascertain the capillary force in different substances. Three glass tubes (Fig. 0) filled severally with fine sand, clay and rich soil, the lower ends supplied with water, by capillary force the water rises to unequal heights—in the sand 22 inches, in the clay 34 inches, in the good soil 44 inches.

I can illustrate the principles better by these charts. Figure 1 represents the unplowed plat; no disturbance of the upward flow; hence the moisture, following the law of nature, goes to the surface and is evaporated. Figure 2 is intended to represent the plowed plat left open and exposed; the upflow, by capillary force, reaching the bottom of furrow slice at "a," meets circulating air and is evaporated; but the drying-out process is hastened by the exposure of the plowed ground at "a" to the air. While at figure 3 the entire depth plowed has been pulverized, and the lower part of the plowed part has necessarily been com-

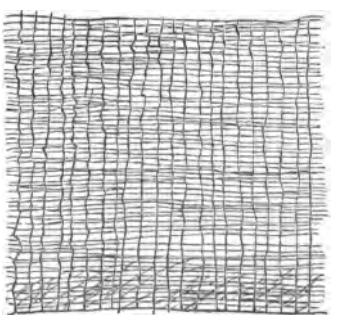


Fig. 1

pacted; the upper portion being left mellow in the form of mulch, the upflow of moisture passes through and up to the mellowed surface; there it remains where it is most needed for germination or for the use of roots of growing plants. The difference between partial preparation and thorough is often the difference between a failure and a crop. This is especially true in the preparation of wheat ground, when the season is dry, as has been the case in Missouri for the past three years. A heavy rain coming after the ground was plowed would of course remedy the defects in part; would settle the loose surface and render the plowed part of even consistency; but the surface would still need pulverization to guard against loss of moisture.

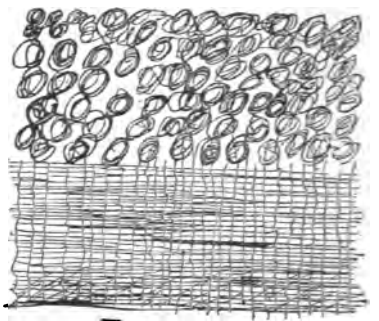


Fig. 2

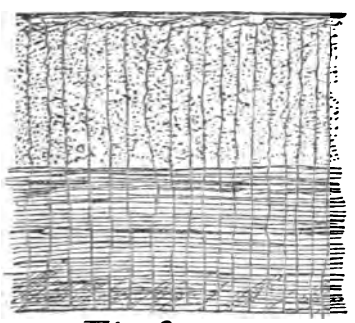


Fig. 3

We are now ready to attempt an explanation of why deep plowing may sometimes be disappointing:

1. When ground is plowed deeply, the chances are that the pulverization will not be perfect to the depth plowed; the upper surface will likely be mellowed, and a lumpy, cloddy condition remain lower down, thus doing a damage to the young growing roots in two respects:

(*a*) The root pasturage will be imperfect for the reasons stated above; hence a stunted and imperfect growth may result at the start, which may influence the final yield.

(*b*) The lumpy condition of the lower half of the furrow slice allows open air spaces, which are not favorable for the continuous upward flow of the moisture. Thus it may occur that the portion of soil that has been pulverized at "b" (Fig. 3) may not receive or retain sufficient moisture for good germination or growth.

2. The ground becomes richer near the top, because of three conditions:

(*a*) The tendency of plant food is toward the surface, brought up in solution in the water, which is going on continuously. As the water evaporates it leaves the plant food near the surface; you see sometimes an illustration of this in ground near salt springs, where there is a salt deposit or crust on the ground.

(*b*) All decaying vegetation, a source of fertility, is on top, unless turned under.

(*c*) The top soil becomes richer by the disintegrating influences of air and sun. Now, if this, the richest part of the soil, is turned down to a depth of ten or more inches, it is beyond the reach of plant roots in the early stage of growth.

From the three causes named, one or two, or all combined, the yield from the deeper plowing may be smaller than from the shallower.

II—AIR.

The second division of our subject relates to the functions of air in promoting plant growth. Air is the great disintegrator, the active destroying agent that decomposes and sends back to their original elements almost all substances, by promoting decomposition and decay. We seal our canned fruits to exclude the air. The air in connection with moisture is all the more potent; we observe that disso-

lution and decay set in much more rapidly in moist, warm weather than in dry; we are wont to speak of the pure dry air of mountain regions, where animal carcasses will resist putrefaction much longer than in damper regions.

From these known facts we reason that air in the soil, in the finer interstices of a pulverized soil, would act with more potency in rendering plant food available than if in a free and circulating state. Besides the act of oxidizing plant food, thus rendering it soluble so as to be absorbed by the roots, it aids the roots themselves in forming such acid secretions as are needful in the more complete development. It follows then that the condition of a tilled soil that best subserves the conservation of moisture, is also the best for aeration.

III—REGULATE MOISTURE.

The third division of our subject has been in part referred to, for the different phases of the subject so blend, the one into the other, that it is difficult to discuss any one without infringing upon the others.

As suggested above, the moisture may in a measure be regulated by tillage. To take away the free water, drainage would be needed, but a discussion of that would be irrelevant here, except in so far as surface drainage would be concerned. Still it would be one of the functions of tillage to so stir the soil as to promote the drying of the same. This has been touched upon already, and need not be further discussed here.

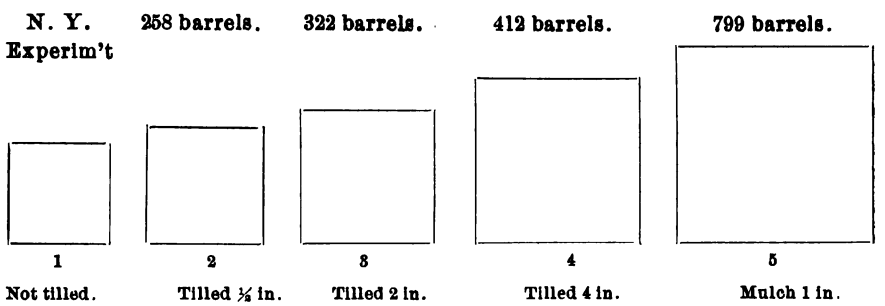
CONSERVATION OF MOISTURE.

By far the more important consideration is the office of tillage in the conservation of moisture.

New York Experiment, 1888—Tilled 2.25 in.; left bare 1.4 in.; sod 0.

The tilled plat contained from May to September 250 tons of water to the acre more than the sod, and 158 tons more than the bare untilled plat.

CONSERVED BY TILLAGE.



Compared with the untilled plat, the one tilled only one-half inch contains 258 barrels of water to the acre more. If tilled two inches, the water content was 322 barrels more; if tilled four inches, 412 barrels more; while a mulch of cut straw conserved nearly 800 barrels, as compared with plat 1.

This experiment points out a greater conservation for the deeper tillage, but not in the direct ratio to depth tilled, for plat 4 was tilled eight times deeper than plat 2, yet only conserved about one-and-a-half times more moisture. It must be borne in mind, however, that there are or may be two disturbing influences that occur in seeking to conserve a greater amount of moisture by deepening the tillage:

(*a*) If the implement used in stirring the soil is of such character as to leave the surface loose and exposed to air circulation through it to the depth stirred,

then a rapid drying would occur in the area thus stirred and exposed. Mr. Terry, in Missouri institute lectures, told us that he had been reducing the width of shovels in his tillage cultivators, from the old broad shovel 8 or 10 inches wide, to one 4 to 6, then reducing still narrower, until he uses largely now the Breed weeder with teeth no larger than a lead pencil—clearly the purpose being to produce a finer pulverization, and avoid so tilling as to submit the surface to the drying-out influences.

(*b*) Root pruning *per se* is injurious; so, then, in seeking to accomplish good in one direction by deep interculture, we do harm in another. Thus we must duly consider the two opposing conditions. If the season were wet, the weeds about to get the mastery, deep cultivation might accomplish two good purposes, while it did only one detriment. It might be advisable to plow in such manner as to allow the ground to dry as much as possible. The farmer should keep in mind all the principles and purposes of tillage, and act as occasion requires, guided by enlightened judgment.

The question of "deep vs. shallow" tillage has received much attention, both in discussion and experimentation. I refer to a few of the many recorded experiments:

DEEP OR SHALLOW.

Mo. Experiment.	Yield.		Average.
	1889.	1890.	
Deep	65.8	41 2	53.5
Shallow	80.1	53.8	66.9
Scraped	82.0	45.7	63 8
Ordinary	72.0	39 8	56 2

Ill. Experiment: Average results for 4 years—1888 to 1891:

Shallow, average	75 9
Deep, ordinary, average	70.8
Scraped, average	72.9

While the average results are decidedly in favor of shallow tillage, an occasional instance occurs where deep tillage has the best results. In an Ill. experiment in 1891, the result was the deep-tilled plats brought 63.4, the shallow 58.4, and the scraped 55.3. It is safe to assert that shallow tillage, whereby some earth mulch is kept on the surface, and the weeds kept subdued, is upon the average the better practice. A slight hilling-up is, as a rule, beneficial, for the reason that the brace roots coming out above ground are liable to perish before reaching the earth, if the weather is hot and dry. Hilling-up around the stalks of corn might enable them to continue their development, and prove of considerable value, whereas, otherwise, they might perish. The Mo. experiment resulted as follows: hilled up 71.8, level 69.3, ordinary 65.

In studying the effects of root-pruning (which accompanies deep tillage), I conclude that the damage is greater in a dry than in a wet season. The roots would doubtless recuperate more rapidly, and in a wet season some good might accrue from deep cultivation, in allowing seration.

The Illinois experiments have been conducted at great length and in detail in that line, and without repeating the interesting tables found in Bulletin No. 20, I will simply point to the results where root-pruning was done for the deter-

mination of this question. For four years, with 36 duplicate sets of plants each year, each alternate row was pruned, and the difference between these and the unpruned rows noted. There was not a single exception; root-pruning proved detrimental to the extent of a decreased yield of from 3 to 26 bushels to the acre. The Missouri experiment points to the same result.

It is a common belief that the main purpose of tillage is to afford "root pasturage." For the determination of this question I have examined many tables of records of accurate observers as to the growth of roots. Some surprises were met. I was impressed with the great force with which roots assert themselves. In a very few days after germination the tenderest roots, almost invisible to the unaided eye, penetrate compacted soils. Tough clays are pierced, even hard-pan is penetrated. I have myself traced corn and grass roots down 3 or 4 feet into the tough clay subsoils of Missouri; I have noted the wonderful force exerted by roots of trees in heaving up pavements. While down in Stone county, Mo., in company with Prof. Powell, of Galena, we went into the mountains. Observing a cedar tree growing far up the bluff, we climbed up to see upon what it subsisted, for the bluff was almost solid rock. We found the tree to be some twelve inches in diameter; it stood on a projection or ledge a few feet wide; its roots took hold under another ledge, and it was evident that the force of the roots in growth had not only raised the upper ledge, that must have weighed over a ton, but had broken it loose from the abrupt wall of the cliff that rose just a few feet behind it. I scarcely know which was the greater marvel—the growth of the tree with so small a quantity of soil to support it, or the exhibition of force of the root growth.

But to the practical suggestions of the tracings of root growth: The roots of young plants seem to pay no regard whatever to the plowed area; they go below it or into it, and are seemingly not influenced in the least by the area that had been plowed. There are other considerations which seem to guide them. They seem to go in quest of warmth, air, plant-food, moisture, etc. The directions roots take are influenced by these. In a New York experiment, a tile was inserted into the ground, filled with rich earth, seed planted in it; the roots, growing, extended to the bottom of the tile, then turned upward toward the surface, and spread themselves where the conditions suitable for growth were—warmth, moisture, plant-food, air. As a verification of this statement, another tile was placed in ground which had been prepared, enriched, pulverized, to some depth below the bottom of the tile; the roots, growing down as in the other case, instead of coming up toward the top, spread themselves out where all the conditions of growth were.

In sandy soils the trend of roots is deeper because of the lower water-level. In Missouri and Illinois soils the larger portion of the roots are comparatively near the surface.

IV—WEEDS.

Weeds are the great agricultural highwaymen, that commit more and greater robberies than the James gang and all the train robbers, plus the burglars and horse thieves. A gentleman from Canada, making a tour through the great corn belt of the Northwest, Illinois, Iowa, Nebraska, Kansas, Missouri, on returning home, reported to his paper, "I have always heard that in those states 'corn was king'; I have found that weeds are king." They rob the plant of food, space, water. But in my judgment the greatest robbery is of water. The plant food they will pay back some day when they decay; but the water they take is gone so far as that crop is concerned. Weeds are greedy drinkers, and we usually need all the moisture in the soil we can get after the crops get well under way. According to Joseph Harris, an acre of clover uses over four tons of water per day.

From determinations made by the Wisconsin Experiment Station (report of 1892), the amount of water that it takes to make one pound of dry matter in farm crops is as follows:

Plant grown.	1891.	Tons per acre.	1892.	Tons per acre.
Oats.....	501 lbs. to 1	2221 tons.	525 lbs to 1	2152 tons.
Corn.	301 lbs. to 1	2991 tons.	316 lbs to 1	2842 tons.
Clover.....	.....	.....	564 lbs to 1	3367 tons.
Peas	.....	.....	477 lbs to 1	1913 tons.
Barley	401 lbs. to 1	1494 tons.	375 lbs to 1	2663 tons.

In these determinations the water evaporated from the ground is included; hence the corn plant, ostensibly requiring less water to produce a pound of dry matter, is accounted for in the fact that water was conserved by tillage in the corn cylinder, and more of it went to the use of the corn.

Water being so great and potent an agent in plant growth, and such great quantities of it being required, and all that is used by the plant must enter through the fibrous roots, it becomes of greatest importance (*a*) that as much as possible be conserved; (*b*) that the roots should have access to every available modicum of space. Water is the active agent in plant-building. It is the energetic miner going down into the subsoil, coming back holding in solution plant-food; passing into the roots, it carries its treasure along up through the plant to the leaves, where the plant-food from below joins the plant-food from above; then as a circulating medium carries on the work of assimilation and cell-building.

As we may call air the great destroyer, we may call water the great builder. It is the most active agent known; it is never still. Place a basin of water in the room, lock the doors and go away; the water will soon disappear in invisible vapor. It leaves the pools, the streams; it is constantly rising up and leaving the ocean. It is carried inland over the earth, is precipitated, runs along in the rivulets, into the rivers, and on to the ocean again. As it falls upon the earth a portion of it settles down by gravitation; some adheres to the soil, but it does not stop there; by capillary force it asserts its right to rise and go on its active mission. Verily water is a wonderful agent in productive economy. To rightly utilize this potent element in crop production is the supreme purpose of tillage.

NOTES.

Fall Plowing.—At the Farmers' Institutes the question is often asked as to the value of fall plowing. The advantages claimed for it are three-fold: (*a*) the exposure of soil to action of frost and weather promotes disintegration; (*b*) destruction of insect pests; (*c*) hastens the work so as to allow earlier planting. On the other hand, the disadvantages claimed are three-fold: (*a*) allows washing of land and leaching of plant food; (*b*) decreases storage water in the soil; the surface being bare all winter, capillary action going on all the time when the ground is not frozen, the water escapes; (*c*) vegetation, especially clover, being turned under in fall, rots and imparts its plant food early in the season, so that it (the plant food) is exhausted too early in the season for best results. This view is taken by Mr. Terry as to potato crop, and Mr. Benton Gabbert, of Platte county, as to corn crop—both close observers. Experiences of farmers show varying results—sometimes fall plowing proving the better, sometimes spring plowing. One experiment in Missouri station gives spring plowing the better results to the extent of four per cent better yield for corn, and fall plowing two per cent for rutabagas.

While observations point to the fact that feeding roots do not need mellow soil to enable them to penetrate it, yet storage roots or bulbs, as potatoes, beets, etc., have not such power of resistance as to make best development in compact soils.

SUGAR FROM THE STALKS OF INDIAN CORN.

BY PROF. T. BERRY SMITH.

When the western hemisphere was discovered, mankind came into possession of many tthings not heretofore had, and notable among them was Indian corn. During the four hundred years elapsed since the days of Columbus, the cultivation of Indian corn has spread around the world, and there is no agricultural product more highly and universally prized. No sight is more common than the corn-fields of our country. You saw them today as you came to town from your rural homes. You have seen them all your lives, and you have toiled in them from the early May till the ears were gathered in the crisp October. You have been accustomed to consider all the labor done in those fields was mainly for the dried ears, the stalks and fodder being a secondary consideration in many cases, and oftentimes no consideration at all. Did it ever occur to you that there might be other ways of using your corn crop? Did you ever ask yourself the question, "Is all this luxuriance of growth of stalk and blade simply for the purpose of yielding, in the end, dried ears and dead fodder?"

You know the dried ears are more or less indigestible, both cob and grain, and that the dead fodder has small attractions for your domestic herds. You are also aware that these same ears in the milky state, and those stalks green and juicy, have great attractiens to your herds and are very nutritious to them.

Why not then use your corn as you do your clover, alfalfa, millet, and such like? In fact, according to the best information I can get, it is becoming the practice in some parts of our country to harvest the crop, stalks, ears and all, just at that stage when the ear is beginning to harden, and to store it away in silos, and then to use the stored material afterward as ensilage. If the whole crop can be used in this way, it seems to be a great advance on the methods hitherto employed of allowing the crop to ripen, then gathering and feeding the herd dry and somewhat indigestible ears, and abandoning the stalks to be a nuisance in the field when cultivation of the succeeding year begins.

But let us consider the matter yet further. Is all the mighty growth of stalks simply for the ear's sake, or is there some virtue in the stalk itself? If there be value in the stalk itself, may not this value be increased by removing the milky ear and then allowing the stalk to spend its powers upon itself? Will the stalk with ear removed dry up at once, as it does with the ear maturing upon it, or will it maintain its verdant luxuriance and increase in weight for weeks afterward, and even until frost comes and ends its career?

If the latter state results, then would there not be a gain in ensilage, by first gathering and storing away the milky ears, and then in due time harvesting and storing the heavier grown stalks and blades?

Granting that all the above mentioned results will follow the course of procedure outlined, the question may then arise, what is the substance upon which the

stalks spend their strength after the green ears are pulled? You may be surprised to learn that experiment shows it to be cane sugar.

Is it possible, then, that our corn-fields may be made to yield two crops in one season? Can our farmers gather and store as ensilage for food, first the green ears, and then a little later the green blades, and afterward take the stripped stalks, and from them obtain an abundant yield of sugar and syrup? Such seems to be the case, and I wish to lay before you some of the facts gleaned from a series of papers published in "Science" during September, '93. They give results of experiments extending from 1884 to 1892, and made by Mr. F. L. Stewart, of Murrysville, Penn.

In the first place, it is a well-known fact that after the ears pass the milky stage they harden rapidly, and with equal rapidity the stalks and blades wither and lose in weight. Analysis had shown that the stalk contained about 7 per cent of sucrose (corn sugar) when the ear began to harden, and about 9 per cent of sucrose when the ear reached full maturity, and that this sucrose entirely dissappeared from the stalks during the brief time of withering and drying up of blades and stalks.

In the second place, Mr. Stewart found out by analysis that stalks from which the ear was removed in the milky state increased in sucrose (sugar content), until the percentage thereof was almost doubled. In other words, he found that the stalk from which the ear was removed spent its powers upon the sugar content of its cells, and increased the amount from about 8 per cent to about 15 per cent.

This fact is graphically shown in the accompanying chart, which explains itself.

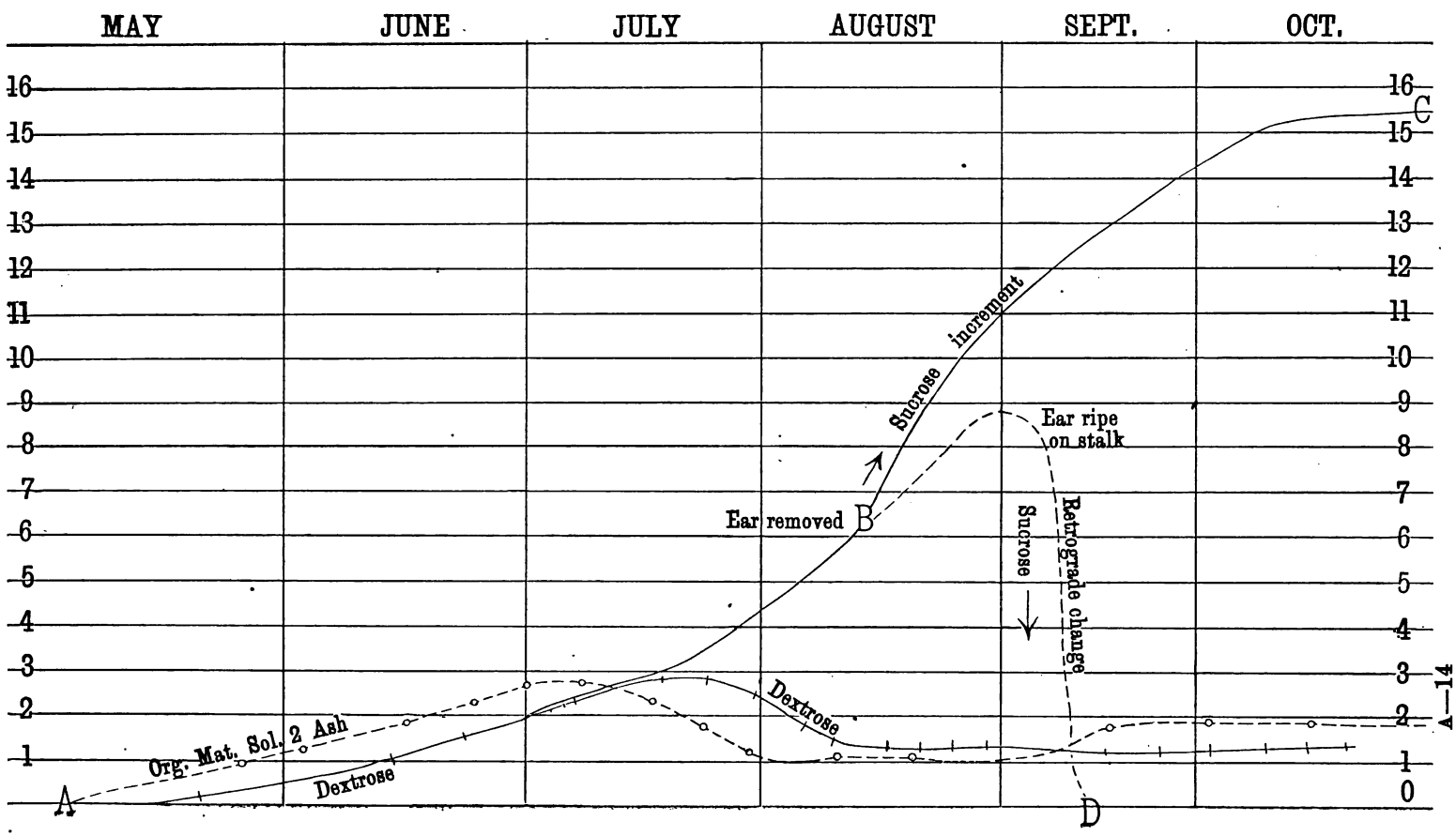
Mr. Stewart proposes to introduce a few new terms, and among them are "juice ripening" and "corn cane." The former refers to the maturing of sugar content, and consequent increase of sucrose in the stalk deprived of its ear, and the latter refers to Indian corn-stalks used for sugar-making instead of the regular sugar cane.

The mention of sugar cane would naturally suggest the inquiry as to the relative values of corn cane and sugar cane as sugar-producing plants, and Mr. Stewart presents the matter in a tabulation which is herewith produced in an abridged form.

Relative composition of the juice of

	Corn cane.					Louisiana cane—mean for 1884-87.....
	In tassel	In silk.	Roasting ear...	Ear removed	One mo. later...	
Sucrose	0.	2.90	6.70	10 32	14 50	13.10
Glucose	1 87	3.00	2.50	1.90	1.25	.78
Not sugar and ash	1.13	2 80	1.80	1 18	1 08	2 35
Water	97 00	91 30	89.00	86.60	83 17	83 77
Totals	100.00	100 00	100 00	100.00	100 00	100.00

It is plain that there is a very large increase of sugar content in the corn cane after the ear is removed, and that the per cent of sucrose in corn cane is equal to or in excess of the sucrose in sugar cane. Now a little further consideration brings out the interesting fact that corn cane furnishes man with both sugar and ensilage, while sugar cane furnishes very little beyond its sugar content. In fact no sugar-producing plant hitherto cultivated, whether sugar cane, sorghum or beet, can be said to be of any value for anything more than its sugar content.


MAY
JUNE
JULY
AUGUST
SEPT.
OCT.
16
15
14
13
12
11
10
9
8
7
6
5
4
3
2
1
0
A
B
C
D
Org. Mat. Sol. 2 Ash
Dextrose
Ear removed
Sucrose increment
Dextrose
Ear ripe on stalk
Sucrose
Retrograde change
A—14

But in case of cornstalks, without any additional or new methods of cultivation it may be made to yield a larger per cent of nutritious provender by the ensilage system, and beyond that a large yield of standard sugar, simply by making a slight change in the long-established methods of curing and handling it.

There is additional interest in the fact that the farmer may plant his corn and cultivate it as usual up to the roasting-ear stage, and then pursue either of two courses: (1) let it stand and make dry ears as usual; or turn ear and improved blade into ensilage and make sugar from the stalks.

Mr. Stewart's suggestions are very interesting. He remarks that corn belts of the earth are much wider than the sugar belts or the sugar-beet or sorghum belts, and therefore the opportunities for production of sugar may be very widely extended.

Again, over-production of dry corn, and the glutting of the markets and the weakening of markets consequent thereon, may be prevented by turning the corn-fields into sugar plantations, even throwing away the ears and blades if need be, as much being utilized under those circumstances as there is in the case of beet and regular cane.

Under the subject of handling corn cane, he explains that the cellular structure is such that the ordinary processes of obtaining the juices from the cane, whether by squeezing it out or by diffusion, must be modified; but experiment has led to the necessary modifications, and therefore everything favors the adoption of this new use of Indian corn.

REPORT OF STATE VETERINARIAN.

Secretary State Board of Agriculture:

SIR—In compliance with your request, I herewith tender you a report of the work done by this, the State Veterinary Sanitary department of the State Board of Agriculture, for the year 1893, compiled from the quarterly reports of the Secretary of the State Board of Agriculture, made in accord with section 8790 of the Revised Statutes of Missouri of 1889, as amended in 1891, and from the monthly statements (financial) made the Board in accord with section 8794 of same statutes.

As is well known, the work devolving upon this Service is twofold, viz., field and experimental. The appropriation being but $15,000 for the two years, '93 and '94, and the field-work being of paramount importance, it was not deemed expedient to institute any experimental work of any moment; consequently, that by me being not fully matured, the report will contain only a resume of the field-work, and articles on a few of the diseases affecting live-stock.

FIELD AND ROUTINE WORK.

During the year the following deputies were continued in service, they having proven good and efficient aids:

Dr. T. E. White, Sedalia, Mo.

Dr. John S. Meyer, St. Joseph, Mo.

Dr. H. B. Adair, Kansas City, Mo.

Dr. F. W. O'Brien, Hannibal, Mo.

Dr. A. Rouif, St. Louis, Mo.

Besides the regular deputies, Dr. C. C. Jackson, of Marshall, Mo., Dr. Paul Evans, of Kansas City, and Dr. Booth, of Moberly, Mo., were deputed to attend to special cases, being able, on account of certain conditions, to do the work at less expense than others.

The deputies, both regular and special, were appointed according to section 8793 of Revised Statutes of Missouri for 1889, as amended

in Session Acts of 1891. The work done by each deputy and the expense of such work will be seen in the following tabular statement.

During March of 1893, His Excellency Gov. Wm. J. Stone called the Board together to adopt the regular annual quarantine regulations concerning the transportation of Southern cattle (cattle south and east of the line defined in regulations) into and through the State of Missouri. The line of quarantine was the same as adopted by the Federal government. The adopting of these regulations necessitated the employment of inspectors to see to the enforcement of same. Not deeming it necessary, no inspectors were placed in St. Joseph and Hannibal as formerly. There were several reasons for the discontinuance of these officers at these places: First, as the Service and laws become more thoroughly understood by both individuals and corporations, there is less resistance generally offered. Second, the fund would not stand the demand for salaries.

The disease, Texas or splenic fever, which Southern cattle are capable of producing in our Northern cattle, being of such a nature that it is, so far as knowledge on the subject has yet been acquired, not amenable to treatment, and as a consequence is always fatal to its host, it is at once apparent that to escape its inroads on our stock, preventive measures become necessary. The quarantine is the best and most certain preventive measure. The better and stronger the quarantine, the less the liability to any damage from this disease. Still more becomes necessary than the mere adoption of regulations and the issuance of a proclamation by the Governor, for in this, as in all laws, officers to enforce it are necessary. Again, the stronger the enforcement, the more efficient does it become. In this, as in other laws restricting persons in any manner, there are found numerous individuals always ready, either through mercenary desires or carelessness, to violate them. By such violation, suffering invariably occurs.

Some years ago this State suffered much from this disease, not only in direct loss of cattle, but also as being a State from which cattle might not, during certain months, be exported. This latter, though no cause really existed for such, was caused either through ignorance or an effort to save money on the part of a certain very influential stockman. The result of this was, the State of Missouri has become known abroad as one of the states on the line of doubt in regard to its own cattle causing the fever, and is still on the black list. All this occurred before we had any State quarantine service. Hence, it will be seen that at the beginning of the work of the State Veterinary Sanitary Service, as it pertains to this malady, it had two evils to overcome: First, to prevent, if possible, by a perfect enforcement of the

quarantine regulations, the death of a single animal in this State from splenic fever; second, to place the State in its proper position in the minds of the exporters of cattle. This may be brought about as a result of the first named duty; and again, by showing the inability of Missouri cattle to communicate this disease to cattle, and their (Missouri cattle) ability to contract malady from Southern cattle.

After the establishment of the State Veterinary Sanitary Service, efforts were made in the lines mentioned to place the State in its proper light by the adopting of regulations and enforcement of same, working at the same time in conjunction with the Federal government. When possible, inspectors for the enforcement of the regulations of the Federal government were secured. When unable to obtain one from government, the State Veterinarian, being the representative of the Service, appointed, at places where they were actually necessary, inspectors. Never more than five have been appointed, and then the United States government has taken charge of these posts, so that in the year 1892 only four were necessary to give us good service.

Every effort was used to secure a Federal Inspector in St. Louis at the Union stock-yards, but without avail. The following inspectors served as such during the year. The time of service being different in each case, a word of explanation becomes necessary:

Joseph Bruser, Inspector, Kansas City, Mo.

Dr. A. Rouif, Inspector, St. Louis, Mo.

Geo. H. Boughner, Inspector, St. Louis, Mo. (Union stock-yards).

No letters of instruction were necessary to Mr. Bruser and Dr. Rouif, they having served the department for several years past. In regard to the salaries, Bruser received $50 per month and Dr. Rouif $100 per month, this latter being $20 less per month than that paid for same work last year, the lack of funds only compelling the decrease, for the work done by the Doctor, who has been an honest, faithful and persistent agent of the Service for years, was worth far more. There being on the 1st of April no inspector appointed for the Union stock-yards, the Doctor also looked after these in addition to looking after his regular business (attending all outside yards). During the time we were trying to obtain a Federal Inspector for the Union stock-yards. Failing in this, Mr. Geo. H. Boughner, of Fayette, Missouri, with whom I had had frequent correspondence, was notified to meet me in St. Louis on April 24th. This he did, and I installed him in his position as inspector, leaving his instructions with him. He received $100 per month for his entire services, to take charge from date of installment.

With these deductions it was thought that the Service could be run, and come within the appropriation. After averaging the first

four or five months of the year, however, it was seen that at the then present rate even, a deficiency might occur. This being the case, still greater economy was demanded. It being impossible to cut expenses of the Service under the then existing circumstances, the discontinuance of the inspector at Kansas City and one of the inspectors in St. Louis was advised.

After this no inspection was made in Kansas City, and Mr. Boughner, of St. Louis, was requested, at no extra salary, to attend to all the work in St. Louis, the Service defraying the actual expense accrued from getting from one pen to another. From now on everything runs smoothly, and it is with much pleasure that I make the statement that not a case of Texas or splenic fever appeared in this State during the year 1893.

The quarantine regulations adopted by the State Board of Agriculture, and proclaimed by the Governor for 1893, are, in outline, the same as adopted by the Federal government. The government, however, in its wisdom deemed it expedient to change its line upon Sept. 1st, and upon Oct. 12, 1893, the following proclamation was issued changing the line so as to conform to government line, thereby preventing confusion and complications:

PROCLAMATION.

Notice is hereby given, that the quarantine regulations adopted by the State Board of Agriculture of the State of Missouri for the purpose of preventing the spread of contagious disease among cattle, promulgated on the 21st day of March, 1893, are modified from and after this day, so as to exclude the counties of Benton, Washington, Carroll, Madison, Boone, Newton, Marion, Searcy, Baxter, Stone, Fulton, Izard, Sharp, Independence, Lawrence, Randolph, Green and Clay, in the State of Arkansas, from the infected area described in said regulations, and the quarantine line established by said regulations is hereby changed so as to place these counties north of said line, thereby conforming the quarantine line prescribed by the authority of this State to the line as presented by the modified order of the Department of Agriculture of the United States, which went into effect on September 1, 1893.

This order is made under the approval of the Executive Committee of the State Board of Agriculture.

In witness whereof, I have hereunto set my hand and caused to be affixed the great seal of the State of Missouri, this 20th day of October, A. D. 1893.

By the Governor: WM. J. STONE.

A. A. LESUEUR, Secretary of State.

In accord with section 8790 of Revised Statutes of Missouri for 1889, as amended in the Session Acts of 1891, the following quarterly reports setting forth the work done in the Service are submitted:

QUARTERLY REPORTS.

TABULAR STATEMENT OF THE FOUR QUARTERS' WORK, SHOWING ACTER AND SYMPTOMS, POST-MORTEM.

FIRST

Date.	City.	County.	Stock.	Attending veterinarian.	Diseases.						
					Glanders.	Puerpera hemorrhagica	Hydrophobia	Sore mouth and tongue	Abscess	Nasal gleet.	Tuberculosis
Jan. 4..	White Store	Howard	Mare	P. Evans	1						
4-5..	Bolton	Harrison	Three mares	Dr J. S. Meyer	3						
10..	Nelson	Saline	Stallion	C. C. Jackson		1					
14..	Hallsville	Boone	Cattle	Dr. Turner				1			
30..	Higbee	Randolph	Cow	"			1				
31..	Conception	Nodaway	Gray mare	"	1						
Feb. 9..		Boone	Gray gelding	"					1		
13..	Wakenda	Carroll	Mare	"	1						
4..	Lead Mine	Dallas									
17..	Appleton City	St. Clair	Mare			1					
5-6..	Platte City	Platte	Gelding	Dr. Turner	1						
Mch. 22..	Nichols Junction	Greene	Bay mare		1						
27..	Ridgely	Platte	Cattle	Dr. Turner			1				
28..	DeWitt	Carroll	Mule	"	1						
26..	Pleasant Hill	Cass	Gelding	"	1						
20-21..	Tarkio	Holt.	Bay gelding		1						
21-22..	"	"	Black mule		1						
Jan. 9..	Wakenda	Carroll	Bay mare	Dr H B Adair	1						
	"	"	Dun horse	"	1						
Jan. 10..	Boynton	Sullivan	Bay mare, mule	"	1						
Feb. 16-17	Milan	"	Gray horse	"						1	
	"	"	Roan mare	"	1						
	Boynton	"	Gray mare	"						1	
Mar. 19..	Wakenda	Carroll	Old mare	"						1	
13..	Lone Jack	Jackson	Jersey bull	"							1

Total number animals visited, 26; total number deceased, 7; total number counties, 15.

DATE, CITY, COUNTY, STOCK, ATTENDING VETERINARIAN, CHAR-
APPEARANCE, TREATMENT, RESULT, ETC.

QUARTER.

Character and symptoms.	Treatment.	Result.
Chronic glanders. Usual symptoms	Quarantined and notified court	
One with prominent and defined symptoms	Quarantined and notified county court	Not heard
Temp. elevated. Petechial spots, and mucus mem. of mouth and nasal passages with swelling of ext. and discharge from nostrils	Prescription used: Tr. ferri chlor. 1 oz.; tr. ergot, 2 oz.; flu. ext. cincho, 5 oz.; pat. chlor., ½ oz. Tablespoonful four times day	Recovery
Swollen condition of mouth, jaws and tongue. Salivation	Pat. chlor. and boracic acid	"
Frenzy and unconsciousness	Destroyed	"
Usual symptons	Quarantined, recommend destruction	
Swelling and fluctuation	Opened abscess and advised syringing with carbolized water	
Discharge from one nostril, and enlarged submaxillary gland	Quarantined until March 10, 1893	
No diseased stock. The petition which he went in answer to was sent without his knowledge by neighbors. Seems to be trouble		
All legs swollen up to the body. Breast and between legs painful to pressure. Mucus membrane pale, not leadened	Gave treatment	
Usual symptoms. Ulcer near eye	Quarantine and advise destruction	
Left leg white, almost to neck. Slight discharge from nostrils	Quarantined	
Probably suffered from hydrophobia		Dead when arrived
Nasal discharges		
Intermitting discharges and other symptoms	Quarantined and notified court	
Well developed symptoms	No treatment	Killed
Well developed symptoms	Quarantined	"
Died, Jan. 8, 1893. Acute glanders. All four legs swollen, and covered with farcy buds. Discharge from both nostrils. Ulcers on both sides of septum nasi. Right submaxillary lymphatic glands enlarged	"	
Discharge from both nostrils. Ulcers on right side of septum nasi. Right submaxillary lymphatic gland enlarged	"	
Left hind leg swollen, farcy buds on same. Sores on left front leg and left side of upper lip; thin in condition	Advised destruction	
Horse thin and down; cannot get up. Discharge from left nostril	Quarantined	
Discharge from both nostrils. Ulcers on both sides of septum nasi, both submaxillary lymphatic glands enlarged	Advised having her treated by competent veterinarian	
Discharge from left nostril. No enlargement of glands. Good condition		
Discharge from left nostril; left submaxillary lymphatic gland enlarged		
Fever 105°F; appetite poor; recumbent most of time; tenderness over intercostal spaces; entire absence of respiratory murmur on right side. Right lung adhering to diaphragm and puracostates	A thorough cleaning where said bull had been	

SECOND

Date.	City.	County.	Stock.	Anæmia	Irreg'lar staggles	Hydrophobia	Sore tongue	Catarrh (nasal)	Pneumonia	Frontal abscess	Glanders	Spinal meningitis	Gleet (nasal)	Ulcer'n pos nares	Farcy	Diarrhœa	Irregular teeth	Tuberculosis	Tumor	Eczema
April 6..	Chamois	Osage	Gelding	1																
8..	Crocker	Maries	Stallion		1															
20..	Troy	Lincoln	Cow and gelding			1	1													
19..	DeWitt	Carroll	Mule					1												
May 12..	Wellington	Lafayette	Two horses								2									
16..	Thayer	Oregon	Two steers						2											
15..	Greenfield	Dade	1 gelding, 1 mare								1				1					
19..	New Madrid	New Madrid	Pony								1									
23..	Fayette	Howard	Gelding								1									
25..	Marshall	Saline	"								1									
27..	Stanton	Franklin	1 gelding, 1 mule									2								
29-30..	Miami	Saline	Three geldings								2		1							
June 3..	Maryville	Nodaway	2 geldings, 1 mule								3									
7..	Marshall	Saline	Horse											1						
13..	Blue Mound	Livingston	Mare and gelding								2									
14..	Carrollton	Carroll	Pony								1									
21..	New Madrid	New Madrid	Mule								1									
28..	Blue Mound	Livingston	Mare								1									
28..	Latoh	"	"								1									
30..	Bosworth	Carroll	Gelding										1							
30..	DeWitt	"	Mule							1										
April 1..	Clifton City	Cooper (15)	Cattle													37				
10..	Brookline Sta.	Greene	Gelding																	
13..	Pleasant Hill	Cass	Two mares								2									
26..	Aurora	Lawrence	Gelding								1									
27..	Grove Springs	Wright	3 mares, 1 gelding								4									
27..	Rader	Webster	Gelding														1			
May 3..	Carthage	Jasper (21)	" mule, mare								2									
10..	Higginsville	Lafayette	2 cows, ylg. heifer															1	1	
12..	Otterville	Cooper	Stallion																1	
14..	Concordia	Lafayette	Mare												1					
20..	Carthage	Jasper	Gelding												1					
June 8..	Verona	Barry (22)	2 mules, 1 horse								3									
9..	Grove Springs	Wright	4 mares, 1 gelding								1					1				
12..	Oyer	St. Clair (23)	Mare																	1
17..	Carterville	Jasper	Gelding					1												
23..	Rich Hill	Bates (24)	"								1									
April 1..	Kansas City	Jackson (25)	2 horses								2									
May 3..	Miami	Saline	1 mare, 5 horses								4									
10..	Lee's Summit	Jackson	1 horse, 2 mares								3									
June 7..	"	"	Mare								1									
Apr. 14-15	Stahl	Adair (26)	"															1		
May 11..	Frankford	Pike (21)	Filly								1									
25..	"	"																		
29-30..	Green City	Sullivan (28)	Filly								1									
April 27	St. Joseph	Buchanan (29)	Gelding					1												
Total..				1	1	1	1	3	2	1	43	2	2	1	3	40	4	1	2	1

Total number animals visited, 107; total number diseases, 17; total number counties visited, 29.

QUARTER.

Character and symptoms.	Attending veterinarian.	Treatment and results	Called by
Very weak and emaciated	Dr. Turner	Tonic, plenty of food.	Petition
Multiple abscesses; redematus swelling along limbs and belly	"	Gen. nerve-blood tonic	"
History pointed to this malady. Cow died before arrival. Gelding had ulcerated tongue	"	Pres. astringent wash.	"
Dysponea, ulcerat'n of post. nares and pharynx	"	Destroyed April 21	"
Horse septum covered with cicatricial tissue; horse (yr. colt), septum gone, also discharges	"	Quar'd; notified court	"
Both dead on arrival. Owner thinks they died of Texas fever, but this is not likely	"		"
Farcy buds and ulcers in nostrils	"	Quarantined	"
Usual symptoms	"	"	Letter
" "	"	"	"
Ulcers; no dis. usual char: dry form in lungs	"	"	Petition
Partial paralysis and knuckling; inability to rise	"	Brom. pot. 1 oz. twice day; nux vom. and bellad. oz. once day.	Letter
	"	Quarantined	"
	"	Quar. gelds; kill mule	Petition
Distressed breathing; food returning thro. nose	"	Advised destruction.	"
	"	Quar'd; notified court	Telegram
	"	" "	Petition
Lost four head; this his last one	"	Dead when arrived; ordered move barn, disinfect premises	"
	"	Quar'd; notified court	"
	"	" "	"
Chronic case nasal gleet	"		"
Enlargement bone; carious smell, discharge from nostril	"	Advised trephin'g and cleansing	"
Cattle very much emaciated; 12 died since Christmas; believed it due to feeding too much corn	Dr. White	Advised plenty of hay	"
Found trouble to be very bad teeth	"	Ordered teeth dressed	"
Bay mare, both submaxillaries indurated, nostrils both eroded; brown mare, same symptoms	"	Quarantined	"
Died day after sending petition; think glandered	"		"
Bay mare, feb. farcy buds on head, chancres both nostrils; dun mare, both submax. indurated; b. g., off submax. slightly enlarged; w. m., chancres both nostrils	"	Quarantined	"
Blind in both eyes; decayed grinder on right side	"	Advised extraction	Request, at Grove Spr.
Mule, right submax. indurated; mare, farcy buds on body, indurated glands, slight discharge	"	Quarantined	Petition
Red cow and heifer, cough; cow, tumor on larynx	"	Adv. kill heif. and cow; red cow will die	Letter
Left hind pastern and fetlock badly affected with "grease;" all horses on place poor	"	Will live but few days	Petition
Right ft. leg, knee to hoof, farcy buds; good flesh	"	Quarantined	Let. (Porter)
Farcy buds inside all legs and on br'st; thin flesh	"	"	Telegrams
All dead; from history think were glandered	"		Petition
One mare same cond. (bad teeth); 1 mare O. K. now; other, both submax. indurated; geld., left submax. indurated; dun m. O. K. now	"	Quarantined one mare	"
Right lung slightly hepatized; heart's action very irregular; temperature, 103⅕	"	Gave treatment	"
Disch.; enlargem't nasal bones, due to abscesses	"	"	"
Almost dead	"	Owner killed her	Letter
One, discharge right nostri, right gland enlarged; other, left hind leg swollen and farcy buds on same, left submax. enlarged	Dr. Adair	Quarantined	Found in practice in Kans. City
Four horses and mare, disch. from both nostrils, ulcers both sides septum nasi, both submax. glands enlarged: one horse, normal condition.	"	"	Petition
Mares, disch. both nostrils, ulcers both sides septum nasi; horse, right hind leg swollen, enlarged glands	"	"	"
Discharge both nostrils, ulcers on both sides septum nasi, submaxillary glands enlarged	"	"	"
Offensive discharge from nostril	Dr. O'Brien	Direct removal	"
Usual symptoms	"	Destroyed	Letter from C. Clark
	"	Not satisfied, left in quarantine	
Usual symptoms	"		Petition
Prominent symptoms	Dr. Meyer	Antisep. and astringents; results good	Answer to city call

THIRD

Date.	City.	County.	Stock.	Glanders or farcy	Distemper	Fistula	Ergotism	Nasal fleet	Purpura	Irregular strangles	Poisoning from foliage	Strongylus falaris	Osteoporosis	Unknown
July 5-6-7..	Yates	Randolph	Horses and colts							7				
	Wakenda	Carroll	Mare					1						
10..	Bowling Green	Pike	Horse							1				
Aug. 6-7..	Foley	Lincoln	Horses	3										
11..	Edgerton	Platte	Horses and mules	13										
	"	"	Horse		1									
	"	"	"						1					
15-16..	West Plains	Howell	Horses		1									
19..		Linn	"								3			
23-24..	Palmer L'd M.	Washington	Horses and mules							4				
Sept. 8-9..	St. Louis		Southern cattle											
11-12..		Franklin	Horses			4								
15-16..	Marshall	Saline	"	2										
August 1..	Bigelow	Holt	Mare	1										
Sept. 27	DeKalb	Buchanan	Mule	1										
July 18..	Frankford	Pike	Mare and mule	2										
Aug. 15..	"	"	Mare	1										
July 13..	Windsor	Henry	Cattle				200							
31..	Higginsville	Lafayette	"											58
Aug. 12..	California	Moniteau	Mare										1	
Sept. 4..	Warrensburg	Johnson	Mule	1										
7..	Washington	Franklin	Mare	1										
9	Gravel Point	Texas	Gelding	1										
15..	Sedalia	Pettis	Mares	3										
Aug. 25..	Independence	Jackson	Horses											
28..	Pleasant Hill	Cass	Horse	1										
25..	Polo	Caldwell	Sheep									1		
	Totals			30	2	4	200	1	1	12	3	1	1	58

QUARTER.

Character and symptoms.	Attending veterinarian	Treatment and results.	How called
Multiple abscesses, fever, anæmia, loss of appetite	Dr. Turner	Ferri sulphates plv. gentianæ rad. plv. a a. 2zj; arsenic, g. e vjjj; mix. et.; pulins No xvj sig 1 night and morning on tongue	.....
Intermittent mucous discharge	"	.....	Petition.
Had been examined by Dr. Neighbert before I arrived, so continued my journey into country.	"	.....	Teleg'm.
Usual symptoms	"	Quarantined and notified court	Petition.
Usual symptoms	"	Six dead; seven living	Teleg'm.
Swollen parotid and sub-maxillaries	"	.....	"
Limited swelling, pectechial spots in nose, fever.	"	Blood tonics, arsenic (Fowler's), 1 oz. in water; 2 a day; good food.	"
Western animals, suffering from poverty and distemper and abuse while being broken	"	.....	Petition.
Poisoning from foliage of overflowed ground, knuckling over at fetlocks, nervous derangement	"	Removed from pasture. Prescribed nux vomica and belladonna. Recovered	"
Usual symptoms	"	.....	Letter...
To settle Meyer matter	"	.....	Teleg'm.
Discharge	"	Free excision astringents	
Usual symptoms	"	One destroyed by owner; the other notified, court and advised destruction	Letter...
Enlargement and tenderness of sub-maxillary gland, ulceration of schniderian membrane, discharge from nostril	Dr. Meyer	Quarantined and killed	.....
Discharge from both nostrils, ulcers on right schniderian membrane, swelling and tenderness of both sub-max. glands, difficult breathing; one had died before I arrived	"	Killed	Petition.
Enlargement and tenderness of sub max gland, ulceration of schniderian membrane, discharge from nostrils	Dr. O'Brien	Reported to county court.	.....
Symptoms as above	"	Reported to county court.	.....
Slobbering at mouth, stupid-looking; 30 of the number had very sore feet	Dr. White	All recovered	Teleg'm.
Gaunt, hair standing on end; could not handle live animals, and none were sick enough to kill for post-mortem examination, so could not make a thorough diagnosis	"	.....	Petition.
Nasal bones enlarged from nares to eyes	"	.....	"
Animal nearly dead when I got there; five head similarly affected had died within last six or seven months	"	Killed	Letter...
Farcy buds on hind legs and around head and shoulders, profuse discharge from both nostrils	"	Killed	Teleg'm.
Bone spavin on right hock, slight erosions on both mucous membranes, small nodules on both sub-max. glands, slight discharge from both nostrils	"	Quarantined	Petition.
Bay mare, blind in right eye, small nodules in right sub-max; neither chancres nor discharges; sorrel mare, both sub.max. enlarged, nostrils eroded, blind in both eyes; black mare colt; dam, sorrel mare, both sub-max. enlarged	"	Quarantined	Letter...
Dead and buried when veterinarian arrived; examined others but found nothing the matter	Dr. Adair.	.....	.....
Discharge from both nostrils, right sub-maxillary lymphatic glands enlarged, ulcers on right side of septum nasi	"	Quarantined	Petition.
Had lost 80 lambs and a few old sheep; coughing and sneezing if moved, difficulty in breathing, scouring in last stages	"	Inhalation of sulphur fumes and sulphur of iron in feed	Letter...

Total number animals visited, 808; number diseases, 11; number counties visited, 21.

FOURTH

Date.	City.	County.	Stock.	Glanders and farcy.	Pneumonia.	Nasal gleet.	Tabes mesenterica.	Puerpura hemorrhage.	Decayed teeth.	Obstinate constipation.	Sarcomatous cancer.	Abscess.	Eczema.	Actinomycosis.
Oct. 12	Pleasant View	Cedar	Cattle				1							
17	Morgansville	Polk	Geldings	2										
17	Schofield	"	"	1										
21	Fredericktown	Madison	Horse					1						
26	Barnetts	Morgan	Mare						1					
Nov. 2	Buffalo	Dallas	Gelding	1										
4	Mountain Grove	Wright	Mare						1					
Dec. 4	Bunceton	Cooper	Cattle							17				
5	Clinton	Henry	Gelding	1										
7	Morgansville	Polk	Mare	1										
7	Schofield	"	Gelding						1					
19	Brookline	Greene	Geldings	3										
Oct. 7	DeKalb	Buchanan	Mare	1										
10	Hemple	Clinton	Gelding	1										
21	St. Joseph	Buchanan	Mule								1			
27	Stewartsville	DeKalb	Gelding	1										
Dec. 7	St. Joseph	Buchanan	Mare									1		
13	Winthrop	"	"											
14	DeKalb	"	Mule	1										
14	"	"	Mare											
22	Winthrop	"	Gelding	1										
22	"	"	"	1										
Oct. 26	DeWitt	Carroll	Mare			1								
Nov. 22	Kansas City	Jackson	"	1										
Dec. 11	Chamois	Osage	Horse		1									
22	Wakenda	Carroll	Mare	1										
	Fairview	Lincoln	Cattle										8	
Oct. 27	Cleavesville	Crawford	Mare	1										
Nov. 17	St. Louis		Cattle											1
23	"		"											1
Totals				18	1	1	1	1	3	17	1	1	8	2

QUARTER.

Character and symptoms.	Attending Veterinarian.....	Treatment and results.	How called.....
Cattle of all ages, affected with lumps in throat and scouring at intervals; 21 head died since March; post-mortem showed congested lungs, or slightly hepatized, with miliary tubercles: liver yellow with large cicatrix	Dr. White		Petition.
In both cases left sub-maxillary slightly tumefied; discharges from left nostril, chancres in left nostril	"		"
Both sub-maxillaries nodulated, large cicatrix on septum of each nostril; profuse bleeding from nostril after discharge	"	Quarantined	"
Horse dead and buried when Veterinarian arrived; Dr. Madison, who had seen horse, reported head and legs swollen and blotches on nostrils.	"		Teleg'm.
Third upper molar on right side decayed; discharge and bad odor	"		"
Small lump on right sub-maxillary; discharge from right nostril; cicatrix on right.	"	Quarantined	Petition.
Third molar in each superior maxillary decayed; discharge with bad smell	"		"
Cattle had been turned into corn-field; eight died within two weeks; post-mortem showed paunch packed with fodder	"		Teleg'm.
Both sub-maxillaries indurated; chancres in both discharge and sneezing	"	Quarantined	etter...
Farcy buds on ribs of near side	"	"	Petition.
Discharge from nose	"		"
(1) Large tumes in right sub-maxillary; erosions in nostril. (2) Left sub-maxillary indurated; nostril eroded. (3) Farcy buds on left shoulder.	"	Quarantined	"
Indurated and corded lymphatic glands (inferior maxillary)	Dr. Meyer	"	"
Indurated lymphatic glands; ruptured farcy buds on right hind limb	"	" and killed...	"
Discharge from right nostril, with cancerous growth above and in nostril	"	Requested destruction....	.....
Free discharge in left nostril; corded and sensitive gland; rapid emaciation	"	Quarantined and killed...	Petition.
Fetid discharge from right nostril; free ulceration; discharge from inferior maxillary	"	Antiseptic dress. & wash.	Letter...
Released from quarantine; had been fed with others that died and were killed	"		"
Free and fetid discharges from both nostrils; hind limbs ulcerated	"	Quarantined	Petition.
Released from quarantine, being exposed with two mules that had been killed	"	" and killed...	Letter...
Discharge of nostrils; lymphatic glands sensitive and corded	"	" " ...	Petition.
Well-defined and prominent symptoms	"	"	Letter...
Fetid discharge from left nostril; upper molar on right side missing, bones forcing food into nasal cavity	Dr. Adair	Advised hav. tooth cut off	Petition.
Discharge from both nostrils; ulcers on both sides of septum nasi; sub-max. enlarged	"	Quarantined	City prac
Discharge from nose; consolidation of right lung; difficult breathing; regurgitation of blood in jugular veins; temperature 104	"		Petition.
Sub-maxillary glands enlarged; discharge from both nostrils	"		"
Sore feet; rebellious to treatment	Dr. O'Brien	Plumbi acetate and carbolic and aqua; potash internally	"
	Dr. Rouif		"
	"	Quarantined	City call
	"	Killed	"

Number counties, 17; No. diseases, 11; No. animals visitsd. 54.

TOTAL NUMBER CATTLE INSPECTED DURING THE SECOND QUARTER,
With permits granted for slaughter.

Date.	Yards.	Southern.	Native.	Total.	Inspectors.
April 23-30	Union	173		173	Geo. H. Boughner.
May 2-31	"	4,084	7,072	11,158	" "
June 1-30	"	8,128	4,485	12,613	" "
Total number native and Southern, U. S. yards.				23,944	
April 1-30	Kansas City		1,950	1,950	Jos. Bruser
May 3-30	"	250	1,829	2,079	"
June 1-30	"	831	1,442	2,273	"
Total number native and Southern, K.C. yards.				6,302	
Total number of cattle inspected during quarter.				30,246	
Total number of permits granted to cattle leaving the Union stock-yards				243	Geo. H. Boughner.
Total number of permits granted to cattle leaving the Kansas City stock-yards				137	Jos. Bruser
* Total number of permits granted during the quarter				380	

TOTAL NUMBER CATTLE INSPECTED DURING THE THIRD QUARTER.

Date.	Yards.	Southern.	Native.	Total.	Inspection.
July 1-31	Union	8,634	3,309	11,943	Geo. H. Boughner
August 1-31	"	7,358	4,738	12,046	" "
September 1-30	"	5,167	6,424	11,591	" "
Total number inspected				35,680	

Yards visited by cattle inspector outside Union stock-yards: Nat. Courtney, 3835 Garfield avenue; W. D. Grant, 3830 Garfield avenue; Dressed Beef Company, Chouteau avenue and Manchester road; Tom Stringer, Twenty-first and Benton; Wolf Cohn, corner Anna and Second street, south; Abe Hatz, alley on Second and Anna streets; Braggird & Malone, 1211 South Second street; Ben. Savgnac, Third and Carr; John Boeples, Second and Soulard; L. Rifles, 2200 South Tenth street.

* It being of not much importance, the number of permits granted was not reported during the remaining quarters, but can be had at the office of State Veterinarian.

TOTAL NUMBER OF CATTLE INSPECTED DURING FOURTH QUARTER.

Date.	Yards.	Southern	Native.	Total.	Inspectors.
October 1-31....	Union.....	5,917	8,916	14,833	Geo. H. Boughner.
November 1-30.	"	3,059	7,408	10,467	" " .
Total number inspected.....				25,300	

Total number of animals visited during 1893.....	495
Total number of counties visited during 1893.....	50
Total number of diseases, contagious and simple ailments, found to exist during the year	26
Total number cattle inspected during the year.....	101,226
Total number letters received and answered during the year.....	1,009
Total number petitions received and answered during year.....	81
Total number telegrams sent and received during year.....	107

Comparison of work of 1893 with work of 1892, and the undoubted decrease of disease in the State, will be found in the Secretary's report to the Board.

The amount expended by this Department for field-work, and possibly a few smaller bills, viz., telegrams, office expenses, express, etc., will be found in the following table, setting forth amounts by quarters, by whom expended, and the number of miles traveled.

This does not include the total amount drawn from the veterinary fund for this year. That amount will be found in the Secretary's report, also amount to the credit of the veterinary fund for 1894.

INSPECTORS' VISITS, EXPENSES AND MILEAGE.

Attending Veterinarian.	Date.	County.	Town.	Exp. of visits & sal'y	Miles traveled
Dr. T. J. Turner.	Jan. 30.....	Randolph.....	Yates		
"	31.....	Nodaway	Conception ...		
"	Feb. 14.....	Carroll.....	Wakenda.....		
"	16.....	Cole	Jefferson City.		
"	26.....	.....	St. Louis.	$713 55	2238
"	Mch. 5-6.....	Platte.....	Plattsburg		
"	10.....	Cole	Jefferson City.		
"	27.....	Cass	Pleasant Hill..		
"	30	Carroll.....	De Witt.....		
"	Apr. 1-3.....	.....	St. L. & Mexico		
"	6.....	Osage.	Chamois		
"	7-11....	Pulaski.	Crocker.		
"	13-15...	....	St. Louis.		
"	18.....	Carroll.....	De Witt		
"	19.....	Lincoln	Troy.....		
"	20.....	....	St. Louis.		
"	May 11	Lafayette	Wellington ...		
"	13.....	Jackson.....	Kansas City..		
"	14.....	Dade.....	Greenfield		
"	15.....	Oregon.....	Thayer.		
"	16.....	.....	St. Louis		
"	18.....	New Madrid..	New Madrid..		
"	20.....	.....	St. Louis		
"	21.....	Boone	Columbia.		
"	23.....	Howard..... .	Fayette.....	985 50	6680
"	24.....	Saline.....	Marshall.....		
"	29-30...	"	Miami		
"	26-27...	Franklin	Stanton.		
"	June 2.....	Nodaway.	Maryville.		
"	3-5....	Howard	Glasgow		
"	8.....	Saline.....	Marshall		
"	12.....	Carroll.....	Carrollton		
"	15-17...	... .	St. Louis		
"	20-21...	New Madrid..	New Madrid..		
"	25-26...	Jackson.....	Kansas City...		
"	27.....	Livingston....	Dawn.....		
"	28.....	Carroll..	Carrollton		
"	29.....	Boone.....	Columbia.		
"	30.....	Carroll.....	De Witt.....		
"	July 4-5...	Randolph	Yates.....		
"	7-8....	Carroll.	Wakenda.....		
"	10-11...	Pike	Bowling Gr'n.		
"	Aug. 1-2 ...	.....	St. Louis.....		
"	7-8 ...	Lincoln	Foley.....		
"	9-11...	Platte.....	Edgerton.....	778 86	3825
"	14-16...	Howell.....	West Plains...		
"	18-20...	Linn	Brookfield.....		
"	23-24...	Washington...	Potosi.....		
"	Sept. 8-9....	.....	St. Louis.....		
"	11-12...	Franklin	Washington...		
"	15-16...	Saline.....	Marshall		
"	Oct. 5-9....	Platte.....	Edgerton		
"	10.....	....	St: Louis.....		
"	15.....	.....	Chicago, Ill...	711 91	4586
"	24.....	.....	Dallas, Tex...		
"	Dec. 12-13...	.....	St. Louis.....		
"	20-23...	Howard.....	Fayette.....		
Totals.....	.....	.....	.....	3199 82	17329

CATTLE INSPECTOR'S REPORT—Continued.

Attending Veterinarian.	Date.	County.	Town.	Exp. of visits & sal'y	Miles traveled
Dr. T. E. White	Jan. 1	Lawrence	Aurora	$117 15	1021
"	Feb. 3	Dallas	Lead Mine		
"	17	St. Clair	Appleton City		
"	Mch. 22	Greene	Brookline		
"	Apr. 1	Cooper	Clifton City	327 00	3014
"	10	Greene	Brookline		
"	26	Lawrence	Aurora		
"	27	Wright	Grove Springs		
"	28	Webster	Rader		
"	May 2	Jasper	Carthage		
"	10	Lafayette	Higginsville		
"	12	Cooper	Otterville		
"	14	Lafayette	Concordia		
"	20	Jasper	Carthage		
"	June 7	Barry	Verona		
"	9	Wright	Grove Springs		
"	10	St. Clair	Oyer		
"	17	Jasper	Carterville		
"	23	Bates	Rich Hill		
"	July 13	Henry	Windsor	137 80	990
"	31	Lafayette	Higginsville		
"	Aug. 12	Moniteau	California		
"	Sept. 4	Johnson	Warrensburg		
"	7	Franklin	Washington		
"	9	Texas	Gravel Point		
"	15	Pettis	Sedalia		
"	Oct. 12	Cedar	Pleasant View	297 85	1966
"	17	Polk	Morgansville		
"	17	"	Schofield		
"	21	Madison	Fredericktown		
"	21	Morgan	Barnetts		
"	Nov. 2	Dallas	Buffalo		
"	4	Texas	Mount'n Grove		
"	Dec. 4	Cooper	Bunceton		
"	5	Henry	Clinton		
"	7	Polk	Morgansville		
"	17	"	Schofield		
"	19	Greene	Brookline		
Totals				879 80	6991
Dr. H. B. Adair.	Jan. 9	Carroll	Wakenda	78 78	822
"	9	"	"		
"	10	Sullivan	Boynton		
"	17	"	Milan		
"	17	"	"		
"	17	"	Boynton		
"	Mch. 9	Carroll	Wakenda		
"	13	Jackson	Lone Jack		
"	Apr. 1	"	Kansas City	48 22	310
"	May 3	Saline	Miami		
"	10	Jackson	Lee's Summit		
"	10	"	" "		
"	Aug. 25	"	Independence	42 55	403
"	25	Caldwell	Polo		
"	28	Cass	Pleasant Hill		
"	Sept. 29	Chariton	Brunswick		

CATTLE INSPECTOR'S REPORT—Continued.

Attending Veterinarian.	Date.	County.	Town.	Exp. of visits & sal'y	Miles traveled
Dr. H. B. Adair.	Oct. 26.....	Carroll.....	DeWitt.....	$52 28	682
"	Nov. 22	Jackson.....	Kansas City...		
"	Dec. 11.....	Osage	Chamois.....		
"	22.....	Carroll.....	Wakenda.....		
Totals	.....	.....	.....	221 93	2217
Dr. J. S. Meyer	Jan. 4.....	Harrison	Bolton	69 00	406
"	Mch. 20	Atchison.....	Tarkio.....		
"	22.....	Holt	Craig		
"	Apr. 27.....	Buchanan	St. Joseph.....	10 00	12
"	Aug. 1	Holt.....	Bigelow.....	31 25	130
"	Sept 27....	Buchanan	St. Joseph....		
"	Oct. 7.....	"	DeKalb	98 50	419
"	10.....	Clinton.....	Hemple		
"	21	Buchanan	St. Joseph.....		
"	27.....	DeKalb	Stewartsville..		
"	Dec. 7.....	Buchanan	St. Joseph		
"	10.....	"	Winthrop.....		
"	14.....	"	DeKalb		
"	14.....	"	Winthrop		
"	22.....	"	"		
"	22.....	"	"		
Totals.....	.....	.....	.....	208 75	967
Dr. F. W. O'Brien	Jan. 6.....	Macon.....	Macon	14 40	64
"	Apr. 4.....	Adair	Stahl.....	62 85	260
"	May 11.....	Pike.....	Frankford		
"	25	"	"		
"	29.....	Sullivan.....	Green City....		
"	July 18.....	Pike.....	Frankford.....	18 50	76
"	Aug. 15.....	"	"		
"	Oct. 30.....	Adair	Kirksville.....	37 65	168
"	Dec	Lincoln	Fairview.....		
Totals.....	.....	.....	.....	133 40	568
Dr. A. Rouif.....	Oct. 20.....	Crawford	St. Louis.....	595 50	
"	.....		Cleavesville..		
Dr. C. C. Jackson	Jan. 10.....	Saline.....	Nelson	10 00	17
Dr. L. E. Booth..	Jan. 6.....	Randolph	Renick.....	28 50	42
"	13.....	"	"		
"	20.....	"	"		
"	27.....	"	"		
"	Feb. 10.....	"	"		
"	Mch. 6.....	"	"		

*Dr. Rouif's especial duty is to attend to city of St. Louis, and attends seldom any work out side. Dr. Paul Evans only doing one visit, his expense is included in my report.

Total amount salary paid Joseph Bruser, cattle inspector Kansas City	$175 00	
Total amount of salary and expenses of Geo. H. Boughner, cattle inspector at St. Louis	738 35	
Incidental expenses for the year	859 64	
Total amount expended during the year 1893	7047 02	
Total number miles traveled during year		28,214

DISEASES.

During the year several articles on various diseases of domestic animals have been given to the public through the medium of the crop bulletins issued by the Board of Agriculture. The diseases existing throughout the State being comparatively few, and those of a contagious nature being those we have had with us for several years, no articles having appeared concerning them, the articles above mentioned, and here following, were written on account of the possible need to the breeding public of such facts.

PARASITES AFFECTING DOMESTIC ANIMALS.

DR. T. J. TURNER, STATE VETERINARIAN.

This subject, a very comprehensive one, covers too vast a field to thoroughly discuss here. In it we will include some of those parasites most commonly met with, and which cause frequent trouble and annoyance. It will be necessary to subdivide the subject in accord with the portion of the animal economy upon which the parasite lives. Frequently the same malady caused by a different variety of species of the same parasite infests different animals, and the general symptoms are about the same. Again, different species cause in the same animal different lesions, the name of the disease being the same.

In selecting from this vast field a beginning, I have chosen the subject of "scabies" or "mange," and that portion of the subject as especially referred to the equine species.

SCABIES, ITCH OR MANGE IN HORSES.

A disease not common in our State, yet one which, when it does occur, causes much trouble, worry and anxiety, is that known as "itch or mange." Of different varieties in the different domestic animals, it seems at once necessary to divide this subject into various subdivisions. As for example, there is a mange or scabies of the sheep, ox, dog, cat, etc. The presence of this parasite, causing disturbance and annoyance to its host, as well as to the owner of the animal or animals, should be recognizable, and the measures necessary to rid the premises of such pest be thoroughly understood. The parasite causing this malady is generally known as scabies, and according to the different manifestations of different species, the subject is divided into several varieties of "Sarcoptic," "Psoroptes Communis" and "Simbioles Communis," all, of course, with the affix "Equi."

These three varieties will now be considered separately, and the chief differences between them noted.

SARCOPTIC SCABIES — DRY MANGE (SOMETIMES EPIZOOTIC MANGE).

This parasite was first discovered and described in 1856 by Delafond and Gerlach. It appeared in the horses of the French army about this time, later on in 1870 and 1871, during the Franco-German war.

Symptoms.—The first intimation we have of the disease is, disposition of the animal to rub itself against anything and everything. The curry-comb is welcome to it, for it rubs and scratches the skin when the itching, caused by the presence of the parasite, occurs. There is also a peculiar curling of the lips during the scratching process. At times the rubbing becomes so intense that the skin will be entirely denuded of hair. Not being able to rub the place, the suffering animal will, if possible, bite the itching part. Upon a more minute examination will be found the pimples (Sarcoptic) caused by the parasite. These papules are very small and many will be found to have ruptured. Upon these there will be found a scab, dry or scaly in appearance, containing in its body several hairs. These scabs can easily be removed by the finger nails. Upon removal, a small red, moist surface is left bare These small patches coalesce, and finally large desquamated patches occur, covered with scales, which by rubbing are constantly being dropped. These patches are irregular in outline, and the portion near the edge which seems healthy, on close examination will be found to be invaded by the parasite.

The last and most important symptom, the finding of the parasite, comes next. This is really the only pathognomonic one (that one that definitely fixes its nature from all other diseases). The adults, both male and female, are found among the crusts on all parts affected. The ovigerous females and larvæ live in the intra-epidermic grooves. These are made by the female, but cannot be seen in the horse as in man, on account of the pigmentation of the horse's skin. In man they are indicated by a fine red line. Where the females pierce the epidermis there will appear one of these pimples; upon examination, the female will be found not there, but at the further end of the gallery or groove. It takes only from about 15 to 30 minutes for the female to run the tunnel, so to speak. If the weather is warm, or the animal's temperature elevated, these may be made quicker; also, if the animal is clothed and it is night. These patches rapidly extend over the whole surface of the body, except the limbs and that portion covered by long, strong hair. As the disease spreads the irritability increases, and almost incessant rubbing is the result. Frequently this takes place to such an extent that the poor animal is found bleeding in various spots. The constant rubbing causes an exudation which organizes and thus causes a great thickening of the skin, which, about this time, has become entirely devoid of hair and has a corrugated appearance; or, to give a homely illustration, like the skin of an elephant. It is of a dull, grayish appearance, now covered with scales which drop off as the animal rubs, and often simply from twisting the head and neck from side to side.

Course and Termination.—To just what extent this disease will impair the health of an animal is not definitely determined, from the fact that in all the nostrums and remedies applied, good is often done and the severity of the attack decreased. Animals will, however, frequently, if not properly cared for, lose much flesh, and their appetites become much impaired. Often of gradual development, the disease does, however, after it has become fully established, spread rapidly. It is at first hard to diagnose this trouble, on account of fewness of parasites and the difficulty to find them. The hair grows very fast over the portions denuded after the parasite has been gotten rid of, and is generally of a darker color than natural. This is also longer than that of surrounding hair, and remains darker and longer until next time of shedding.

Contagion.—This disease in its initiation, is not very contagious, from the fact that Sarcopts are not of a migratory disposition, and being few in number, stay close to their host. As the disease progresses and the scales are formed, then the contagiousness increases very rapidly, and a well horse associated with a mangy one may become affected in a very short while. The Sarcopt may be transferred by litter, rugs, cloths, walls of stalls and any utensils, such as curry-combs, etc. These may be transferred, and are capable of affecting the mule and ass as well as the horse. Cattle may possibly become affected; although it is exceedingly rare. Man may also be affected, but the parasite does not find in him a suitable host and soon dies.

Treatment.—This may be divided into three categories: A, B, C.

(A) The animal or animals affected must be first separated from the healthy ones, and possibly those affected had best be separated one from the other if the disease is in different stages of development. This being done, the hair should be clipped from the entire body, the animal having been removed to some point distant, to a place where the hair will not blow away, and can be collected. After the clipping, the surface invaded will always be found to be more extensive than was formerly supposed. After the clipping has been thoroughly accomplished, all the hair should be collected in a pile and burned. After all affected animals shall have been subjected to this same process, the utensil or instrument used for clipping shall be thoroughly cleaned by submersion in boiling water for three or four minutes.

Washing and Soaping.—(B) The clipping process now being completed, take 2 to 4 pounds of soft soap and smear all over the body of the animal, thoroughly rubbing it in, in order to soften and penetrate

the scales. Let this soap remain on the animal an hour, then by means of a soft brush scrub the animal well. This being finished, take tepid water (soft preferred) and thoroughly wash off all soap and scales. Dry the animal by scraping and then by rubbing with wisps of hay or straw. If one washing does not remove crusts another may be applied; one, however, usually suffices. The straw or hay wisps must after use be burned.

(C) The body being thoroughly cleansed, remedies or preparations which are destructive to the growth and propagation of the parasites must be applied. These remedies are numerous, and only the best will be noted here. They may be summed up in three, viz., tobacco, sulphurated potash and sulphur. If near a tobacco factory, the liquid ooze or refuse may be applied, 2 oz. of liquid to 1 oz. of oil. This is both efficacious and cheap. If not near a factory, an ooze or decoction may be made of stems and used in a like manner. Sulphurated potash in concentrated solution, 9 oz. to 1 qt. of water, is often employed and is very efficacious. The following prescription will be found to be excellent:

Solid tri-sulphuret of potassium	10 parts.
Carbonate of potassium	2 "
Lard	300 "

Mix thoroughly.

Sulphur is used in sulphur pomade (sublimed sulphur 10 parts, lard 300 parts), or another pomade, Helmrick's (sublimed sulphur 200 parts, carbonate potash 100 parts, lard 800 parts).

Of these sulphur preparations the latter, Helmrick's, is probably that of greatest merit.

In using the remedies here mentioned, the entire body may be covered at one time save in the tobacco treatment; that, on account of the possible poisoning, had best be applied to only half of body at once, and then after two days remaining on, wash off as body was washed first time. Dry and make another application to other portion affected. This method of applying to one-half at a time must be used in all preparations of an oily or fatty nature, as by applying to whole surface at once the action of skin is likely to be impaired and much damage done. The preparations of sulphur before mentioned must be left on the animal's body for three or four days, after which a final washing shall take place as before, always taking the precaution to burn hay, straw and such like material. Usually one application suffices; if it does not, however, another may in a few days be used.

In cases of localized mange, creolin has been used and is frequently efficacious. It is a very nice application and is also economical.

Another preparation which has been used is crude carbolic acid (1 part of acid to 3 parts of water, mixed with 4 to 5 oz. of sublimed sulphur to gallon of solution of acid). This is a very common remedy applied haphazard on the plains and has given rather good satisfaction.

Disinfection.—All harness and apparatus as well as curry-combs must be thoroughly disinfected. This may be done by five minutes' submersion in boiling water, as 70 degrees F. kills the parasite. If you do not wish to do this for fear of injuring the harness, use solution of creolin or sublimated sulphur. Burn all hay and trash around, also scrape floor and walls of stable, and subject to jets of boiling water if possible. Remove all manure and cover deeply in manure pile. Then whitewash walls, floors and mangers of barn, mixing with whitewash two oz. crude carbolic acid to one gallon of whitewash. No constitutional treatment is needed save in cases of long standing, where the condition is bad, the appetite capricious and anæmia exists. The treatment indicated in such cases is the preparation of iron, nux vomica and general tonics.

SCABIES EQUI (MANGE IN HORSES).

Other forms of scabies are known as psoroptic and symbiotic.

PSOROPTIC SCABIES.—This form of mange has been longest known and is the most common. It affects all the equines and may appear as an epizootic.

Symptoms.—This variety of scabies attacks, especially, the foretop, mane and tail. It may, however, attack the whole body except the limbs—that portion occupied by long hair being the region primarily attacked. The disease is ushered in by itching and rubbing the parts covered by the long hair. Upon closer inspection the hair will be found to be matted and tangled together; untangle and look under this mat of hair and the epidermis will be found to be raised in certain spots by a serous exudate forming a pimple. The quantity under the epidermis continues to increase, and finally an oozing occurs, or the vesicle or pimple breaks. The serum in the vesicle thus liberated dries, forming a scab, including in its body the hair. As the serosity continues the scab becomes thicker, containing as it does the desquamated epithelial cells and debris of the skin. The serum is very viscid,

and at times has a very unpleasant odor. The psoropts live in agglomerated colonies on the epidermis, and as the vesicles are caused by the psoropt piercing the epidermis, we will find these sores, scabs or vesicles very close together. This being the case, these ulcers soon coalesce, and one large scab or almost crust will be found, and under these scabs around its edges will be found the parasites. This variety of mange is slow of development and spreads slowly over the body. It remains localized for quite a while in forelock, mane and root of tail, then gradually extends to submaxillary space, neck, chest, and along the thighs and base of tail. It does not extend in same manner as does sarcoptic scabies, the borders of the ulcers being more definitely defined, and not so much of the surrounding tissue being involved. The upper part or ridge of the neck may be found in well-marked cases covered with scabs and transverse ridges, from which a very viscid and foetid serosity exudes, especially in the summer. The skin becomes very thick and much infiltrated. Being slow in spreading and a large portion of the diseased skin remaining, much damage is done and going on in portion affected ere we are aware of it. The hair will drop off as these scabs enlarge and increase, leaving a reddish pink, greasy, shiny surface beneath. The natural color of the scabs is yellow, but they are frequently reddish on account of the bloody infiltration. The most prominent symptom is, of course, the sight of the psoropts.

Course, Duration and Termination.—Slow of development, this variety seldom ever invades the entire body. No duration can possibly be given. This is not amenable to spontaneous cure, though it succumbs to treatment easily. Death seldom results unless from carelessness and ignorance on the part of the owner.

Contagion.—The same cause prevails in this as in the sarcoptic form, viz., the parasite causing the malady. Condition of weather and such like causes cannot possibly be credited with this, as they may only be predisposing causes. Animals may become affected from same intrinsic causes as noted in sarcoptic variety, and the contagiousness of the disease from an affected animal increases as the disease becomes more disseminated over the animal.

Removed from the animal, the parasite in dry atmosphere remains alive 10 or 15 days, in stable 20 to 30 days. The males die first, the unfecundated females next and the fecundated last.

Prognosis.—Longer localized, less contagious and more easily combated; it yields readily to treatment. The skin remains thick often for a long time after the cure is effected.

Treatment.—The curative measures used in previous varieties may be applied in this form with as much hope of success. The hair must be clipped from furrows along the neck but left on ridges, and circular tufts be taken from tail over parts most affected, thus allowing a more easy application of remedy and the circulation of air through the remaining hair.

A very good preparation, besides those mentioned in connection with the sarcoptic variety, is that of:

Tar two parts and soft soap one part; apply to diseased parts.

SYMBIOTIC SCABIES. *Symptoms.*—This species attacks the limbs of animals, beginning at the heels or fetlocks, and gradually extending up the limbs. The presence of the disease will be first noticed by the rubbing of the animal of one leg on the other, the stamping, and, at times, the biting of the heels by the horse. The hind limbs are usually the first attacked. This form is of extremely slow development, and may remain on an animal for a year or so and not spread and cause little trouble. Coarse and hairy-limbed animals are the variety that are affected. Finely bred, thorough-bred animals are not bothered with this form to any extent.

Upon a close examination of affected animals the parasites may readily be found. Again, when these parasites have appeared and pierced the skin, large tufts of hair may be pulled off. In winter only do these parasites pierce the skin, as during the summer the natural excretions are sufficient to support them, and it does not become necessary for their life that they attack the skin.

Contagion.—This, as other forms, is contagious only from diseased to healthy animals. The mediums of contagion may be, as in other cases, such articles as curry-combs, brushes, etc. This is the least contagious of any of the forms and less liable to produce much harm. These parasites live a long while in manure and should be kept from it if possible.

Prognosis.—If properly handled, or rather any care at all taken of these animals, the disease will make no progress, and the animal recover.

Treatment.—Clip hair over and little beyond the affected portion, then with brush thoroughly brush the limbs affected and remove all parasites and ova. This should not be done where the brushings will fall away from manure pile. After this wash off with brush, using decoction of tobacco. Again the lotion used in former types may be tried. Washing with benzine or oil of turpentine is good.

Diagnosis.—The three forms of this disease may be readily diagnosed one from the other by parts of the body attacked, methods of and rapidity of development and habits of parasites, and from animals that are affected with lice by finding the parasite.

GASTROPHALUS EQUI AND BOT FLY.

These insects, commonly known as the Gad or Nit flies, are very common in this country. First making their appearance about June, they continue to be a pest to horses until October, the months of July and especially August being those in which they are most troublesome and in greater numbers. The female fly differs from the male in having at the posterior of the abdominal segment an oviscarpt.

About the middle and hottest part of the day we see these flies very busy about the heads and limbs of the horses. These two flies, viz., the one that deposits the egg on the hair of the limbs, and the one that deposits them on the long hair about the lips and throat of the horse, are a different variety. The eggs, however, and the larva are very similar, and it is consequently useless to note minute differences in this instanee. The fly will be seen buzzing around and standing apparently still in mid-air; this it does by balancing itself with its oviscarpt and its wings. Very quick in its movements, it darts at the limbs of the animal and deposits its egg upon the hair. This tickling the animal causes it to stamp. Hence we have the incessant stamping during these months.

The egg is of a yellowish white color, and adheres to the hair by means of a gelatinous material secreted at the time of its deposition. The egg is about the shape of a hen's egg, the smaller end, however, being more of a point. In depositing it the sharp end is always down, the more rounded portion being superior. It is always deposited with its longest measurement parallel to that of the hair.

After remaining on the hair four or five days the egg hatches. The larva pushes its way out through the operculum supplied at the top of the egg, and, being very vivacious after it has entirely freed itself from the egg, it begins to wriggle around among the hair, causing an itching. This causes the animal to bite and scratch its legs with its lips and mouth, thus getting the larva into the mouth and starting it on its way through the alimentary tract. Those deposited upon the lips of the animal cause an itching in the same way, and a nipping and scratching on fences, getting them into the mouth in that way. The fly that deposits the eggs upon and around the lips of the horse irritates the animal very much, and will cause him to throw his head around in a very annoying manner. At times, in fact, the animal will strike with both

feet, trying, apparently, to kill its enemy. Then, again, they will strike out and run, thus trying to evade an attack.

At first the larvæ are very long, being composed of about 13 segments, but later and at the second moulting they are composed of only about 11 segments. Upon the anterior of the larvæ are two antennæ or horn-like attachments, by which means they attach themselves to the walls of the stomach, or upon whatever portion of the canal they fall. The body portions of the larvæ are covered with stiff hair-like appendages or spines. The larvæ of these two flies are somewhat different in appearance, that of the Gastrophalus Equi being of a paler color, not so pink as that of the other. That of the Hæmorrhadalis at times, much more frequently than the Equi, lodging in the fauces, the larynx and along the æsophagus. They may, though it is an exceeding rare occurrence, be in such numbers in these localities as to cause distressed breathing, or may choke the animal. The usual course of the larvæ (bots) is to continue their journey until they reach the stomach of the animal and there become lodged. This they do by means of the two antennæ or mandibles, at the anterior extremity. With these they pierce the coats of the stomach and cause a little sore, thus producing a slight inflammation. Upon the product of this inflammation they subsist. They seldom are found in any save the left section of the stomach, and as a result cause but little if any harm. They remain in the animal economy about 10 months, when of their own accord they loose their hold upon the stomach or intestines and begin their exit. At times we may find these worms (so called) in the right section of the stomach near the pyloric orifice, and also in the duodenum. After beginning their exit they pass out in a short while. Now out of their host and very active at first, they begin to change their color to that of a darker, rather greenish cast; then still changing they become brown. All this time in their active state they are burrowing themselves in the ground, and by the time they have reached the brown stage they are to a sufficient depth. Then they become sluggish, their active life ceases, and they go, so to speak, in a trance. They become perfectly motionless and remain thus for 30 or 40 days, at the end of which time they again make their appearance in the world as full-grown gad or nit flies (*Gastrophalus Equi* or Hæmorrhadals). Thus we have the cycle of existence complete.

The Bot while in the Stomach.—This parasite seldom causes any appreciable trouble in its host, though it is condemned as the offending body by the stock owner in the majority of digestive disorders. Attached as it is to the walls of the organ in the left sac, remaining

motionless in this position until it loosens to take its final exit, and living not upon the tissue of the organ, but upon the inflammatory products caused from the small ulcer, it causes necessarily but little, if any, inconvenience to its host. They usually are seen attached in colonies, and the sores are often many, and sometimes coalesce.

Manner in which trouble may be caused.—Although causing no injury, it is nevertheless possible for these parasites to do irreparable harm to the infected animal. Some have gone so far as to say that the Bot has eaten clear through the walls of the stomach. This may possibly be so in a few isolated cases, yet even then it is doubtful. The majority of cases in which this is said to have occurred are those in which the eating or perforation has taken place after death. The only manner in which it becomes possible for this larva to cause any trouble to its host may be summed up in the following methods: First, if they should be in great excess in the stomach, they might cause, by their great number, an inflammation so great that *gastritis* or a general acute inflammation of the organ may arise and terminate in death of the animal; or, if in the fauces, causing death by *asphyxia*. If in the duodenum they may impair the passage of food, especially if in large numbers near the pyloric end of the stomach. The walls of the duodenum being thinner than those of the stomach, the parasite might, with more likelihood, pierce entirely through the walls, thus causing either a *peritonitis* or an *enteritis* (inflammation of the bowels) or an *endo-peritonitis*.

Either of the above maladies usually terminates fatally. They may also interfere materially with digestion in the stomach by being present in great numbers and attaching themselves in the pyloric portion near the pyloric opening, not only causing an obstruction to the passage of food, but also causing irritation in that portion where the gastric juice is secreted, thus interfering with its secretion. By so doing the digestion is impaired, and we have in such instances the Bot, the immediate cause of colic or abdominal pain.

Appearance of the Stomach.—The appearance of the mucous membrane of the stomach will present numerous little pits the size of the head of a pin. The floor of the pit or sore is of a pinkish hue, and the edges will frequently be composed of cicatricial tissue. This, of course, after the Bots have been removed. They do not loose their hold soon after death, and are frequently found in the stomach on post-mortem some hours after death has occurred, still attached to its walls.

The sores above mentioned may be close together, and may at times coalesce, thus causing one large, ulcerated-looking sore. Again, at times there will be found small cicatrices, indicating the attachment formerly of a bot.

Treatment.—Animals suffering from digestive disorders are frequently supposed to be affected with bots (such an expression meaning that the bot was the cause of the manifest misery). We have seen how such is really seldom the cause; still, however, some treatment is demanded. Various nostrums are given with positive belief as to their curative properties. Among these may be enumerated sweet milk, ash lye, etc. In truth, most all of the anti-parasitic remedies have been used to try and rid the system of this parasite, without any satisfactory results. Leaving their host naturally after 10 months' habitation, there is little need to be alarmed, no remedies to rid the animal of them being necessary. They usually begin to migrate about June and cease about the last of August. In the treatment of supposed cases of "bots," if the remedies of known repute that are advised for digestive disorders, and especially acute indigestion, be given, we will experience no cause or need any remedy by means of which we may be able to rid the patient of "bots."

SUMMER SORES IN HORSES (GRANULAR DERMATITIS).

During the summer months stock-raisers and owners are troubled by the appearance of sores on their stock, especially jacks. These sores are very rebellious to almost all forms of treatment, and consequently cause much trouble and worry, not only to the owners, but to the animals themselves.

Symptoms.—This particular form of the summer sores appears on those parts of the body most liable to injury, such as the points of shoulders, along the neck, head, and on the limbs of the animals.

In 1850 this disease was first noticed, and an account given of it, but not until 1868 have we a good description given. At first the heat was supposed to be the cause of the malady, and it has from time to time, by various veterinarians, been attributed to different causes. It appears most frequently in India, and the army veterinarians have given many and various reasons for or causes of its origin. Lately, however, the immediate cause has been determined and will be found in a Nematode (a parasite), which has been named Filaria Irritans. The first indication or lesion noticed is a small scratch or prick. This is not noticed, save that it seems to itch and annoy the animal. On a close examination there will be found an oozing of straw-colored serum.

As the rubbing begins the itching seems to increase in the same ratio, and in a day or so the sore will have assumed the dimensions from the size of a ten cent piece to that of a quarter, and possibly at times larger.

The sores, the edges of which are at first of an irregular character, finally assume that of a circle. The surface is that commonly known as similar to a mushroom or proud flesh (exuberant granulations). These granulations are unhealthy and are of a pale color. Over the surface will be found this yellowish serum. On feeling the surface of sore these granulations will be found soft and flabby, and small furrows or cavities will be found between the ridges. In these furrows will be found this same fluid and at times of a semi-fluid consistency very similar to gelatin. These surfaces bleed very easily. These parasites run the poor animals almost crazy at times, causing them to rub and bite the sores, tearing out all the unhealthy growth. This is only temporary, for the granulations in an extremely short while will again fill the places. Upon pressure and pinching the surfaces of the sores and also squeezing the sore from the periphery, we are able to obtain small yellow granules. These may be picked out with the finger nail, pin, knife, or anything in fact with point. This granule is the Nematode with its calcareous or cheesy covering. These granules are in size from that of a head of a pin to that of a pea.

Course, Duration, Prognosis.—Beginning as a benign affection and by the constant rubbing and biting becoming very troublesome, this disease runs a very variable course, lasting during the remainder of the summer, usually, after it has once begun. It does at times nevertheless, under treatment, succumb within fifteen or twenty days. The tissues under the skin are affected as the disease progresses and the constant rubbing is allowed to go on; hence we find joints exposed, tendons lacerated, and sheaths destroyed. Left to take this course, the malady assumes a very ugly and serious aspect. In such cases the likely result depends much upon the extent of the lesions.

The two most important factors that aid in developing or helping the primary cause of this trouble to produce such serious results and continue so long, are the itching and the summer heat. I have thought also that the warmer the day or the season the more intense the rubbing. This, in part, at least, being caused by the animal being very warm, the entire body begins to itch on account of the poor grooming, the hair and skin surface being covered with dirt mixed with desquamated epithelium. Also, sweat which runs down and around the raw edges of the sores will irritate and increase this itching.

Etiology.—The immediate cause being the larval Nematode, the above factors assist this parasite.

Treatment.—This has been almost as varied as have been the practitioners and experimenters dealing with it. Believed to be due at first simply to the heat, cold was applied to the parts in the shape of packs and constant irrigation; then, again, from the nature of the sore, the granulations being mistaken for the ordinary so-called proud flesh, various caustics were employed. The results obtained by both the foregoing methods have been far from satisfactory.

Flies being so bad in summer, it was thought that by putting bandages over sores and keeping off these pests that one cause of irritation, stamping and rubbing, would be averted. This proved to be wrong, for the bandage caused irritation to the part, which, although not so in appearance, is very sensitive to the slightest touch. The sulphuret of arsenic has, however, in the hands of some, proved of much benefit—the powder being spread over the surface of the sore in an almost imperceptible layer. Again, others have had most satisfactory results from the application of (sulphuric) ether, chloroform, and the application of iodoform for from eight to ten minutes, two or three times daily; after the application, the part to be covered with collodion. It must be borne in mind, also, that the animal must be placed in position, if possible, where it will be impossible for the sores to be irritated by rubbing. These sores may be healed in one season to make their appearance the following season, lasting at times for two or three years.

Very respectfully,

T. J. TURNER,
State Veterinarian.

ERGOT, ERGOTISM AND ABORTION.

The article of Dr. White, of Sedalia, which appeared in Colman's Rural World of July 20, concerning the appearance of "ergot" poisoning among the cattle of Henry county in this State, doubtless recalls to many the outbreak of a similar nature several years ago in Callaway county, and suggests to every one the question: "To what extent is this poisoning or 'ergotism' likely to prevail?" Anticipating this inquiry, I take the liberty to answer it and recall some facts to the minds of stockmen, breeders especially, concerning other dangers to stock from this fungus.

The Fungus (Ergot).—Ergot appearing, as it so often does, on the various grasses, it would be well for all to recognize it. This parasite, for the growth of which a wet season is always conducive, begins its

growth about the time that the seed of the plant is in that stage commonly known as "milky." It begins its growth upon this embryo seed, and the seed is soon by its enemy destroyed. Appearing as it does upon the seed, it begins its life and grows as does the seed within the seed-pod, husk or covering. Rapidly reaching a size too large to be contained within this covering, it begins to burst it, and ere the ripening of the grain the "ergot," or "smut," or "blight," may be seen protruding through the pod.

After the fungus has become full-grown, and the seeds in the unaffected pods or husks have ripened, the presence of the fungus is easily detected. Upon a close examination, without the aid of any microscope, protruding from the seed-pod will be seen a small black speck, or possibly there may appear a small black rod one-half the length of the pod. This is the grain of "ergot," smut or blast of the fruit. The shape varies in the different plants it attacks. Those grasses that are used for hay are frequently its host. The most frequently affected is probably blue-grass, with red-top next—the shape of the grain, as it appears on blue-grass, being somewhat curved in its longitudinal measurement, giving it the appearance similar to a crescent. It is only when this fungus is taken in poisonous doses that any trouble occurs, it being used as a medicine frequently.

Manner in which It acts.—The action of the poison, when taken excessively, is upon the circulatory and nervous systems. The circulatory is by far the most frequently attacked, acting, as it does, as a styptic, hemorrhage or blood-stopping medicine. It does so by causing contraction in the caliber of the blood-vessels, thus causing a stasis, a stoppage of the blood, and hence a lack of nourishment of the part. As a consequence of this lack of blood supply we have a death of the part, and dry rot, or gangrene, is established. This slough occurs without any blood. Besides that form of poisoning mentioned, and the symptoms which are so ably defined by Dr. White, there is a nervous form. This, however, is rare, and the symptoms are very similar to those defined in the article from this office, headed, "A New Cattle Disease."

Abortion a Consequence.—When ergot is taken by animals that are pregnant, before they reach the stage where circulation is stopped, an abortion occurs. It is to this fact I wish to call the especial attention of the breeders, especially of cattle. This, taken into the system, will cause uterine contraction, will, to a certain extent, shut off the blood supply, and an abortion will be the result.

There will be much ergot this year in the grass as it stands in the pasture, and this winter in hay that is used. Much care and watchfulness must be used to prevent this. Already some abortions have occurred from the taking into the system of this poison. Cattle are more prone to poisoning or abortion on account of sluggishness of their circulation and the large area for absorption offered by the digestion tract. That ergot is to be in great excess this summer, fall and winter is manifest on account of its appearance now, and the excessive wet season.

A Word of Caution.—To prevent the loss of foals and calves by abortion and premature births, I would urge upon the stockmen to look well to their grass, both now and in the fall, and to their hay supply in the winter. If any outbreak should occur this department will do all in its power to aid. This, however, must be borne in mind, that but little benefit can be derived in any manner from any source after the animal has become affected and the symptoms become manifest. Hence, I will again impress upon the owners of stock that the remedy must be that of preventive measures and not medicinal treatment.

REPORT OF MISSOURI WEATHER SERVICE.

CO-OPERATING WITH STATE BOARD OF AGRICULTURE.

To Hon. J. R. RIPPEY, *Secretary State Board of Agriculture:*

DEAR SIR—The subjoined report of the Missouri Weather Service for the year ending December 31, 1892, is respectfully submitted.

The work carried on in this department during the past year has been principally the collection, compilation and dissemination of meteorological and climatological data, the publication and distribution (during the crop-growing season) of the weekly Weather-Crop Bulletin, and the establishment of weather signal display stations and general dissemination of weather forecasts.

The Service continues to be an entirely voluntary organization, co-operating with the State Board of Agriculture, and has been and is being developed and extended with a view primarily to the interests of the farmer.

A careful study of the climate of a state, with particular reference to the crops that are grown, is of the highest importance to its agricultural interests. What are the conditions of the weather that cause insect pests to thrive? What is the average date of the last killing frost in spring? When may the first killing frost be expected in autumn? What crops are best adapted to the climatic conditions of the several sections of the state? These and a hundred other similar questions can be satisfactorily answered only by a reference to accurate and continuous weather records. It is the aim of this Service to obtain such records, to study the climatology of every section of the State, and to disseminate the information thus obtained.

STATIONS AND EQUIPMENT.

The year closes with 109 voluntary and five regular Weather Bureau stations in the State, and 14 stations on the borders of adjoining states co-operating with this Service.

These stations are located at points carefully selected as regards geological formation and general topography of the State, and make daily observations of temperature, precipitation, prevailing wind direc-

tion, character of weather, heavy rains or snows, hail-storms, thunder-storms, floods, and, in fact every form of atmospheric disturbance that is liable, either directly or indirectly, to affect the business interests in their immediate vicinity, or of which a record will be of value in the study of the climatology of the State in general. Complete reports of all such observations are forwarded promptly at the close of each month to the central office at Columbia, for further compilation and dissemination.

All these stations are equipped with standard instruments, thereby greatly improving the reliability of their records.

The ownership of the various instruments in the hands of voluntary observers is as follows:

Ownership.	Thermometers.			Rain gauges.
	Maximum.	Minimum.	Exposed.	
U. S. Weather Bureau.....	13	14	6	18
Missouri Weather Service.....	26	25	2	77
Personal.....	7	8	22	9
Total.....	46	47	30	104

In order that this branch of the work might be further extended and observation stations established in counties from which there are no reports at present available, twelve sets of maximum and minimum thermometers were purchased from Messrs. Schneider Bros. of New York City, at a cost of $5.80 per complete set, and are now being issued as rapidly as observers can be secured in the counties referred to.

Owing to the very limited appropriation, it has been impracticable to make a personal visit to the several stations for the purpose of examining the instruments and instructing the observers, and much of this important duty has necessarily been imperfectly accomplished by mail.

A correct exposure, proper surroundings and proper elevation of instruments are most important factors in the determination of the climatic conditions of the different localities, and as absolute accuracy is imperative and essential, an occasional inspection of voluntary stations by a competent meteorologist is very desirable and very necessary.

MONTHLY METEOROLOGICAL BULLETIN.

The data collected by the voluntary observers, and others co-operating with this service, is carefully compiled and systematized in this office, and published monthly in the form of a 9×13-inch eight-page pamphlet, devoted strictly to the meteorology and climatology of the State. The present issue of the monthly bulletin is 250 copies, the limited number being due to lack of appropriation for printing purposes. They are distributed among voluntary observers throughout the State, professors in schools and colleges and private individuals interested in the work.

A material increase, both in the size of the bulletin and the number of copies distributed, is respectfully recommended. The increased value of the publication to the agricultural interests of the State would fully justify the expense.

During the year there has been in operation a plan by which the reports of a number of the voluntary observers have been published in their county papers, the necessary blank forms and franked envelopes for mailing purposes being furnished from this office.

WEEKLY WEATHER-CROP BULLETINS.

One of the most important features of the work of this service is the publication, during the crop-growing season, of the Weekly Weather-Crop Bulletin.

This bulletin is a weekly summary of the weather and crop conditions in each section of the State, and is based on special weekly reports, received by mail, from a corps of between 300 and 400 reporters.

During the season of 1893, the work of publishing the bulletin was carried on very successfully, the number of copies issued weekly being about 1200, and the number was limited only by office force and mail facilities. The first number of the bulletin was issued on April 11th, and the last on October 3d. Through the co-operation of the Associated Press the bulletin was telegraphed to St. Louis early in the morning of the day of issue (Tuesday), and a copy furnished the local forecast official weather bureau at that station, who also co-operated in this work, and who had the bulletin put in type and a sufficient number of copies to supply all points in the southeastern portion of the State printed and mailed, thus placing the bulletin in the hands of those interested much earlier than could be done from this office. A copy of the bulletin was also furnished the publishers of "patent sheet" newspapers in St. Louis, and by them distributed to 90 papers in the State, with an average circulation of 700 copies per week each.

Many evidences have been received that these weekly crop reviews are highly appreciated, both by the farmers and dealers in farm products; and this, combined with the extensive publication by the papers, through dissemination by the Associated Press, and the receipt at this office of numerous telegraphic requests for information derived therefrom, go to prove that the publication is increasing in popularity among those interested in the agricultural resources and interests of the State.

These reports are of special value to the farmer, as they keep him informed of the condition and progress of crops in all sections of the State, and furnish him with an approximate idea of the year's production, thus enabling him to regulate his sales to advantage. They are also of value to all classes of business men, and especially to those dealing in agricultural products.

As soon as available appropriation and office force will admit, it is proposed to issue a weekly temperature and rain-fall chart in connection with the bulletin, as by this means the weather conditions of the preceding week can be graphically illustrated and the value of the bulletin greatly increased.

Receiving, examining, sorting and compiling the numerous reports received, putting in type, printing, folding, wrapping and mailing the weekly edition of the bulletin, with the present facilities for printing, require excessive work at the hands of the present office force, in order that the bulletin may be mailed in time to reach those interested on the following day, and before any material increase can be made in the number of copies printed, it will be necessary to have better facilities for printing. A small expenditure in this direction would result in great benefit to the State.

DAILY MAPS, FORECASTS, COLD-WAVE AND FROST WARNINGS.

The National Weather Bureau co-operates with this Service in the matter of distributing forecasts, frost and cold-wave warnings by telegraph, forecasts by means of railway bulletins, and daily weather maps containing the forecasts by mail.

The number of weather maps mailed daily to points in Missouri from the Weather Bureau stations in the State is as follows:

St. Louis, 237; Kansas City, 49; Hannibal, 241, and Springfield 6. In addition to these a few points in the State are supplied from Cairo, Ill., and Keokuk, Iowa.

Frost and cold-wave warnings are telegraphed to 54 points in the State, and during the spring and autumn frost warnings are telegraphed to a much larger number.

Cold-wave and special bulletins are furnished agents of the Keokuk & Western railroad by telegraph from Keokuk, Iowa.

Daily forecast, frost and cold-wave bulletins are mailed to 33 points in Missouri from Kansas City, and to three points from St. Louis. Cairo, Ill., also mails forecast and river bulletins to five points in Missouri.

Through the co-operation of the Wabash railway, forecast, frost and cold-wave bulletins are issued daily from Columbia to agents of that road from Columbia to Centralia; from Centralia east to St. Louis; from Centralia west to Kansas City, and from Moberly north to Coatsville.

The dissemination of forecasts, frost and cold-wave warnings is constantly extended, and we hope the time is not far distant when every city and town in the State, where the agricultural interests will justify the expense, will be furnished with daily forecasts, either by telegaaph or telephone, or by mail.

Through the co-operation of a number of those now receiving forecasts daily by telegraph, a plan is being put in operation by which over 200 postmasters in the smaller towns will be furnished the forecasts by mail. Upon receipt of the telegram from the local forecast official at St. Louis, the displayman will duplicate the forecast by means of rubber logotypes, on cards furnished for the purpose, and deposit the cards in the mail in time to reach the postmasters in neighboring towns during the morning or early afternoon of the same day. The postmasters will be furnished with bulletin boards, bearing an appropriate heading, upon which to post the cards for the benefit of the public.

FINAL REMARKS.

During the month of November, 1893, a change was made in the instructed man detailed by the National Weather Bureau for duty with this Service, Mr. H. A. McNally being relieved by Mr. E. Herbert Nimmo. Owing to Mr. Nimmo's previous experience in State Weather Service work, the Service was in no way inconvenienced by this change.

In closing this report, I would earnestly renew the recommendation made by my predecessor, in his annual report for 1892, that in the transmission of this report to the higher authorities you bring especially before the executive the necessity for a liberal appropriation to be applied to actual expenses in renewing and examining the instruments at the various stations, in providing all stations recording temperature with instrument shelters of the standard pattern, and in allowing the observer in charge of the Service to make a yearly tour of inspection of all voluntary stations needing the same.

I would also recommend that an increased appropriation be asked in order that the monthly bulletin may be enlarged and more widely distributed; that better facilities may be provided for printing the Weekly Weather-Crop bulletin, and that the force at this office may be increased by the permanent employment of a competent assistant.

The thanks of the Service are due to the press of the State for the valuable assistance it has rendered in disseminating the agricultural information issued from this office, also forecasts, cold-wave and frost warnings; to the Chief of the Weather Bureau, for the detail of instructed men, the use of the official frank for mailing purposes, supplies furnished and instruments loaned, as well as other effective co-operation and assistance rendered; and above all to the voluntary observers and crop reporters who have so ably, faithfully and cheerfully devoted their time to the work of the Service without pecuniary remuneration.

Very respectfully,

A. E. HACKETT,

Observer, Weather Bureau, Ass't Director.

TABLE OF MONTHLY AND ANNUAL MEAN TEMPERATURE

At Stations of the Missouri Weather Service for the Year 1893.

Station.	January	February	March	April	May	June	July	August	September	October	November	December	Annual
Appleton City	26 5	31 1	42 7	56 7	63 1	74 6	79 4	74 0	72.5	57.7	43 0	37.4	54.9
Arthur		27 2	39 5	53 9	61 3	72 6	76.4	70 8	63 2	51.5	35 0	32.4	
Atchison, Kas	21.5	26 2	39.2	53 2	61 4	73 6	78 2	73 2	70 2	58.4	40 2	33 2	52.4
Bethany	17.1	23 2	35 5	49.8	60.5	73 6	75 8	70 5	68 2	54 6	37 0	27 7	49.5
Birch Tree								78.1	69 8	56.4	42 8	39 0	
Bluffton									72 7	59.2	43 2	37 8	
Brunswick	21.5	27.2	41.0	54 3	62 8	74 1	78 2	72 0	69.4	56 8	41 6	33 8	52 7
Bryant			48 7	57 8		71.0	75 9						
Cairo, Ill	29.4	36 4	48 8	60 2	65 0	74 8	80 1	76 1	71.0	57.9	46 1	40 0	57.0
Carrollton	20.7	25 4	40 2	53 5	62.1	73 3	77 6	72 9	70 5	54.9	42 2	34 6	52.3
Centerville, Io	12 6	21.2	35 8	48 2	60.1	72 2	77 7	72.8	66 2	54.9	37 2	29 4	49.0
Clarinda, Io	13 6	18.2	33.9	47 7	57.8	70 6	75 3	69 4	66.0	54 0	35.2	25 4	47 2
Columbia	22.7	28 4	41.9	55 2	62.6	73 0	77.2	73 6	71 7	59 2	42 4	35.6	53.6
Columbus, Kas	27 6	31.1	43.4	58 1	63 4	73.6	79 6	75.0	72 3	60.0	42 0	39.6	55.5
Conception	18.1	23 8	36 4	49 2	60 0	72.0		71 4		57.5	41.2	27 5	
Concordia	23 6	29 3	41 7	58 0	64.8	76.7	81.9	73.8	72.0	58.6	40.7	34.8	54.2
Cowgill			42 6	50 8	62 5	70.2	75.7		66 2	52 7			
Darksville	20.9	20 8	35.7	50 5	61.1	73 4	77.8	72.4	71 4	58.7	45 6	36.4	52.1
Dixon			42 8	55.2	65.1	75.6	79 8	75 5	71 9				
East Lynne	23.6	26 0	38 2	52 0	59 0	72.4	77.3	70 4	67 7	52.8	37.6	34 4	51.0
Edge Hill	26 0	30.9	40 3	51 9	58 4	66 0	69 4	66.6	60 0	50 4	42.4	40.2	50.0
Edina	18 6	23.8	37.2	49 6	60 1			75.6					
Eight Mile	23 9	28 2	41.1	58 6	60 3	71.4	76 4	71.1	69 4	56.7	40.6	36.2	52 4
Eldon	24.4	28 0	41.7	55.3	61.3	71.5	75 7	73 2	71.7	58 8	43,9	38 0	53.6
Fayette	22.3	28.2	41.2	54 5	63 6	75 2		76 0	73 0	59 6	41 2	34.8	
Fox Creek	25 2	30 2	43 9	56.6	63 6	73 4	77.0	72 7	70 7	57.4	42 7	36.2	54.1
Gainesville	29.3	34.7	43 6	56 7	67 4	70 8	76.4	72 8					
Gallatin	18 5	24 9	33.8	52 9	62 1	75 9	80 0	75.4	72 0	60.6	39 9	32 2	52 8
Gayoso		37 6					83 0			57 8	46.2	40 6	
Glasgow	20 3	26 7	40 3	58.1	61.6	73 1	77 4	73 0	71 4	58.9	40.4	34 7	52.6
Gordonville	26 8	33.7	43 3	57.1	61.1	69.5	72 0	70 8	66 8	52 4	41.7	37 2	52 7
Gorin	19 6	22.1	35 9	48.9	57.8	71.6	77.7	71 3	65 9	53 4	36.8	28.8	49 2
Griggsville, Ill	17 0	25 4	39 2	51 4	61.4	72.4	76.8	72 4	70.2	56.2	40 0	30 6	51.1
Grovedale	29.7	31 8	43 1					70 4	68 4	55.8	39 2	39 5	
Halfway												25.8	
Hannibal	18.4	24 6	33.9	52.0	61.0	72 7	77.7	72.2	69 6	57.2	49 4	32 0	51,4
Harrisonville	22 3	27 6	40 5	55.8	62.7	75 3	80 2	76.0	73 5		39 2	33.4	
Hastain		31 2	43 6	54.4	60.6	72 0	77.4	69 2	70 6	56 7	40.6	36 4	
Houston	29 7	36 3			64 0	71.2	75 6	69 9	66 2	54 0	41 2	39 2	
Humansville			43.0	56 8	62 6	72 6	77 9	72 2	71 6	57 8	41.2		
Ironton		33 8	43 2	57 7	62 4	70 0	75 3	69 6	67.5	58 9	40.8	37.7	
Jefferson City	22 0	30 0	44 8		62 9	74 2	77.8	72 2	67.9	57.1	41.7	36.3	
Kansas City	22 0	27 0	40.2	53 8	62 0	72.6	77.6	73.2	71 4	59 2	41.0	35 4	53 0
Keokuk, Io	14.7	21 3	36.6	49.9	59 8	73.0	78.0	72.4	67.8	56 6	38.9	29 0	49.8
Keesees Ferry, Ark	33.6	36 9	47.0	61.0	65 6	73 8	78.6	74 4	73 3	57 8	41 6	42 4	57 5
Keosauqua, Io	14 4	22 0	36.8	49.8	59 3	73 5	78 2	72 1	68 5	57 1	38.2	27.0	49.7
Kidder	17.8	24 0						70.9	68 3	57 2	39 8	31.1	
Lamar	28 7	32 6	44.2	58.3	63.2	73.7	79.2	75.0	72 8	57 8	43.2	39.8	55.7
Langdon	16 6	17 8	36 8	49 4	58 8	72 4	76 9				37 4		
Leavenworth, Kas	21 8	27.0	39 8	53 4	61 1	73 2	77.9	72.8	70 4	56 6			
Lebanon	28 1	31 8	43.8	58.0	63 6	70.8	75.5	71 9	70 4	56.2	43 2	38.4	54 3
Lexington	22 8	28.1	40.7	53.7	62.3	72.4	75.8	71 6	69.6	59.8	42.2	36.1	52.9
Liberty	21.9	27.0	41.1	55 5	64 2			76.0	72 1	59.2	41.0	34 6	
Linn Creek	30 0	31.4									41.2	36.8	
Marble Hill	27.5	33 8	45 6	56 4	63 8						41.6		
Marshall	20.2	25 8	39 4	53.2	61 6	71 6	75 9	71.3	69 5	56.8	39 3	33.7	51.5
Mascoutah, Ill	23 8	30 8	41 8	54 3		74 0	79.4	73 4	72 1	54 4	40 2	37.9	
McCune Station	18.7	26 0	39 6	52 5	61 0	71.3	77.1	72.2	70 1	55 9	40 2	32.2	51 4
Mexico	19 5	26 2	39 7	53 2	62 4	72 4	78.4	74 8	71 4	56 4			
Miami	20 8	27.8	40 6	53 9	61 7	71.6	76.6	71 6	69 6	58 8			
Mine LaMotte	29.0	33 9	45 4	59.1	63 7	71 8	76.1	73.2	70.2	55.9	44.1	38.4	55.1
Mound City	17.8	24,1	37 0										
Mount Vernon										59.4		45 5	
Neosho	30.3	32.0	45 0	58 6	63 3	73 4	79 4		71 3			40.0	
New Boston	16.6	17.7	34 8	44 1	61.4	76 5	78.9		69 6	53.3	37 2	30 8	
New Hartford			42 0	57.7	63 2	74 2	72 9	75.8	73 8	58 5	41.0	34 0	
New Haven	24.0	29.0	41.6	55 9	63.6	75.7	80 9	76 5	72.8	57 5	42 8	37 4	54.7
New Madrid								77 8	72 5	59 6	47.7	42 6	
Oakfield	24 8	30.8	43.8	56 8	63 6	73 9	78 5	74.8	71 9	58 4	33 2	36 0	53.9
Oak Ridge	25.6	32 1	42 3	56 9	59.4	68 8	73 8	71.0	67 8	56 0	43 8	38 2	52.9
Olathe, Kas						74 2	78 0	71.7	69 6	57.0	42.2	35.4	
Olden	34 2	35.2	46 2	59 6	64 2	72.4	76 6	73.3	69.7	58 3	45 1	40.7	56 3
Oregon *(a)*	18.2	24.0	37 2	51.8	60 7	73.3	77.0	72 0	68.8	58 1	39 8	31.8	51.0
Oregon *(b)*	18.6	24.1	36.8	50 9	50 1	72 3	76.2	71.4	68.5	57.6	37.8	32 2	50.6
Panacea				56 6	61 5	70.4	76 0	71.8	68 6	55 0	41 8	39 2	

MONTHLY AND ANNUAL MEAN TEMPERATURE—Continued.

Station.	January	February	March	April	May	June	July	August	September	October	November	December	Annual
Paris	19 2	27.2	38.4	52.2	61.7	78 4	75 4	....	.....	.....	....	....	.....
Phillipsburg	28.4	31.5	43.8	58.0	65 0	73.5	75 4	75.4	71 8	55.6	41 5	37.6	54 6
Pickering	16.1	19 4	31 8	46 4	56.0	68 7	73 4	67.8	64 8		37.4	28.7	.....
Platte River	18 7	24.8	34 8	49 2	58 9	69.6	75.1	73.7	70.1	50.6	39.6	34.3	49.9
Poplar Bluff	32 1	36.5	45 6	61.2	.....	.....	.....	.....	.....	.....	....	....	.....
Potosi	.....	....	....	....	.....	....	....	.....	.....	50 2	40 4	35.7	.....
Princeton	15.3	22.6	35 4	50 3	58 6	72 7	78.2	71.2	66 9	56 2	37.8	28.8	49.5
Rea	15.4	20 4	34.5	49 4	59.1	71 5	76 2	69 6	64 0	....	....	....	.....
St. Charles	24.9	30.1	42.8	55.6	62 9	73 5	77.9	73.3	71 2	57.4	43 1	35.8	54.0
St. Louis (*a*)	24.8	30 8	43 8	56.6	64.0	75 2	80 2	75.8	72.6	58 7	44.1	36.3	55.2
St. Louis (*b*)	23.8	29 5	42.2	55.4	62.0	72.2	77.8	71 8	69.4	55.6	42 0	36 0	53 1
Sarcoxie	.....	.....			...	...	...	78 6	.....	62.1	46.6	42.4	.. ..
Sedalia	21 8	27.2	40 7	54 4	63 7	74.6	79 0	74 2	72 0	58 5	41.4	35.2	53 6
Springfield	20.7	32 9	43.9	57 7	63 2	71.5	77.2	73.7	72.0	57.6	43 2	38.6	54 4
Stanberry	17.9	23 4	36.1	50 0	59.9	71.9	76 7	.....	.....	...	....	....	.....
Steelville	28.0	31 8	43 2	55.3	61.6	69 7	73 3	....	.....	50 8	37.0	34.2	.....
Stellada	24.2	28.8	42 1	56 0	62 8	75 0	80.1	74 0	75 2	59.4	44.4	38 4	55.0
Sublett	.....	22.2	36 6	50 4	61 0	73.0	76 9	70 8	68 0	56.2	.....	.....	.....
Unionville	...	...	34 1	47 2	59 3	70.3	79.2	74 3	66.7	60.5	29 2	26 1	.....
Vermont	23 0	27.0	40 2	53 5	61.0	72.3	76.7	71.4	69.6	55 8	40.2	35.5	52 2
Warrensburg	23 5	..	...	55.0	62 9	.....	78 4	73.8	72.1	58 7	41.4	...	.....
Warrenton	23 1	30.2	41.4	54.4	61 8	73 5	78 2	.....	71.7	56.1	41.8	34.0	.....
Wellsville	25 2	27 5	39 2	.....	61.6	.....	...	.....	.....	.....	.....	.....	.....
Whiteside	20 3	26 2	40 2	52 8	....	....	76.4	72 5	70.3	56 4	41.6	.....	.....
Number stations	79	88	85	88	82	80	81	80	81	82	81	79	.....
Monthly mean	22 5	27.9	40 5	53.9	61.8	72 6	77 3	72 8	69 9	56 7	40.9	35 2	52.7

TABLE OF MONTHLY AND ANNUAL PRECIPITATION

At Stations of the Missouri Weather Service for the Year 1893.

Station.	January	February	March	April	May	June	July	August	September	October	November	December	Annual
Akron	.....	0 92	1 78	5.51	4.38	5 35	5 97	4.09	2 46	...	.....	0 92	....
Appleton City	0 50	1 65	3.25	8 64	5 64	4.59	8 92	1 29	3.28	0 08	1.23	0.60	34.67
Arlington	6 81	0 98	....	8 57	4 30	4 90	4.80	2 31	4.33	0.40	....	0.95	....
Arthur	0.20	0.94	1 84	9 68	4 65	6 72	2 58	2.08	4 86	0 20	2.20	0 25	36.20
Atchison, Kansas	0.11	1 35	2 89	3 15	4 60	6 25	5 54	4 73	4 14	0.11	0.95	0.32	33.64
Bethany	0 40	1 60	1 84	5 00	4 81	4 81	4 66	4 02	4 88	0 33	0 89	1.06	33.80
Big Piney	0 89	0 95	1 60	10 22	4.82	3.60	6 45	3 90	5.72	1.11	1 40	1.09	41 75
Birch Tree	.....	.....	.....	.....	....	....	.....	3 02	3.53	1.08	2.48	1.74	.....
Bluffton	.....	.....	.....	.....	.....	.....	.....	.....	2.35	0.27	1.52	0.76	.....
Boonville	0 63	1.84	.....	12 55	8 76	7.08	11 32	0 71	2 14	1 87	1.50	1.75	.....
Brunswick	1.75	1 40	2 27	6.09	6.47	6 89	6.08	1 00	2.61	0.60	2 07	3.88	41.11
Bryant	.....	1.05	3 88	5.22	....	2.41	4 77	....	.....	.....	.....	.....	.....
Cabool	.....	2 60	4 77	10 13	4 84	4.20	3 85	3 07	8.10	.....	.....	.....	.....
Cairo, Ill	1 26	3.93	2 09	6 91	6.70	7 59	1 23	1 64	6.63	6 26	2.75	1.60	48.79
Canton	0 92	2.17	1.82	6 50	5.77	1 29	2 05	1 58	2.64	....	...	....	.....
Cape Girardeau	0 40	3 27	....	5 73	3 50	4 65	1 25	1 00	2 60	.....	1.10	....	....
Carrollton	0 65	2.96	2.22	7 48	6 02	6.75	11 28	1.33	4.04	0 15	2 43	0 86	43.62
Carthage	0.49	1.47	2 01	7.66	5 91	4 24	0.69	4 18	6 27	1.22	0.89	....	.....
Centerville, Iowa	0.55	2.10	1.10	4 80	5 04	3.05	2 67	3.20	4 20	1.30	1 45	2.80	32.26
Clarinda, Iowa	0 68	1 12	1.73	8.11	3 17	4 12	8.84	6 22	2.38	0 09	1.05	0.76	38.27
Columbia	0.89	1 97	2 82	11 30	6 00	6 83	6 63	0 94	3 45	0 59	1 16	0 55	42 63
Columbus, Kas	0.86	1.19	2.39	8 51	5 85	3.35	3.24	2 42	5 99	1 00	1.42	0 93	36.65
Conception	0.43	2.77	3 92	5.30	5 65	7.08	5.00	4.71	4 05	0.00	1.01	0.72	40 64
Concordia	0 85	0.80	1.64	5 37	1.77	3 35	11 93	1 10	2.60	0.60	1.37	0.20	36.58
Cowgill	0.60	....	1.10	5 62	4 79	3 04	5 88	2.12	5.08	0.20	.....	.....	.....
Dadeville	0.20	1.65	2 51	9.32	11.52	4.96	1.68	1.71	...	...	...	...	.....
Darksville	1.00	1.96	1.90	4.15	5 99	5 88	5.27	1.62	2 05	0.92	1.72	0.75	33.16
Dixon	.....	.....	3.51	12 19	7.09	5 35	4.16	3 15	5.84	.....	...	...	.....
Downing	.....	.....	.....	.....	.....	.....	.....	2 51	.....	.....	1.74	0.65	.....
Dumas	.....	.....	.....	.....	.....	.....	.....	1 75	...	...	...	...	...
East Lynne	0.42	1 22	3 14	6 98	8.41	3 00	5.48	1.39	4 22	0.90	1.56	0.29	36.26
Edge Hill	0.42	3.22	4.38	9.36	7.21	5.11	3.95	1.00	4.08	1.50	2.71	0.97	43.86
Edina	1.24	1.85	2.27	5 98	5.83	....	....	2.05	....	.....	.....	.....	.....
Eight Mile	0 55	1.22	2 96	7 33	8.52	3.29	5.05	1.14	3 87	0.30	1.53	0 21	35.96
Eldon	0.16	2.20	3.56	12.82	7.44	4.06	8.07	1.80	3.02	1.38	1 52	0.93	46.96
Fairport	.....	.....	.....	.....	.....	.....	.....	6.17	4 85	0.39	0.72	0.95	.....
Farmersville	0.33	1.63	1.35	7.11	5 66	4 95	6.50	3.54	5 85	0 46	1.15	1.17	39.70
Fayette	0.55	1.73	2 45	10 70	7.27	7.03	.....	1.08	1.94	1 73	2.13	0 64	.....
Fox Creek	0 48	2.50	5.02	10.35	7 03	4.17	2.30	1.93	4 34	0 87	1.57	1.53	42.09
Fulton	0 58	1.35	2.89	9.72	6 26	7 79	3.64	1 94	2.94	0 73	1.53	0.86	40 23
Gainesville	0.77	3 64	4.67	7.70	4 62	2 97	5 58	3 38	....	.....	.....	.....	.....
Gallatin	0 28	2.12	2.00	5.88	5 26	6.55	7.21	4.28	7 04	0.41	1.12	1.84	44.09
Gayoso	0.54	5 86	...	...	...	...	2.30	0.92	7.30	3.30	4.72	2.61	.....
Glasgow	0 74	1.07	2 50	7 54	5.50	8.58	6.52	0 54	2.40	1 34	2.00	0.30	38.08
Glenstead	0.60	1.00	2 70	13.49	6.74	2.00	10.60	2 28	1.68	2.00	...	...	.....
Gordonville	0.78	3.14	3 12	8 11	7 39	7.28	0.45	1.68	4 76	6.26	2.44	2 17	47.45
Gorin	0.65	1.38	2 32	6 76	4 46	3 22	2 59	1 89	3.40	0 80	1.83	0.60	28 90
Griggsville, Ill	0.42	2.82	6 22	7.69	5 65	3.80	3 38	0.35	1.37	0 33	1.25	1.38	34 66
Grovedale	0 39	1 56	3 69	11.10	6.39	6 24	5.93	2.55	3.99	0.56	1.50	1 36	45.26
Halfway	....	....	....	....	....	....	....	....	4.43	2.09	1.42	1.27	....
Hannibal	0 54	2.12	2.64	6.06	7 04	5 19	1.50	0.54	1.46	0.50	1.25	0.36	29.22
Harrisonville	0 27	0 94	3.11	5.56	7.09	3 43	4.06	1.92	4 09	0 03	1.48	0 29	32 27
Hastain	0 62	1.82	3.33	10 48	5.74	3.21	6 74	0.48	2 05	0.64	1 48	0.67	37.36
Hermann	0.58	3 51	.....	9 70	5.81	5 98	4 50	2 33	2.99	0 49	1 57	1.02	.....
Houston	0.11	1.33	...	.....	4.48	7.06	4 43	1 64	7 51	0.54	1 91	0.51	.....
Humansville	....	....	3 05	9 85	7 39	5.25	6.74	1.27	4.67	1.08	1.25	.....	.....
Irena	0 52	1 45	1 97	4.58	4 21	...	...	...	...	...	...	...	...
Ironton	0.50	3 45	4 78	8.63	7 25	5 46	3 82	2.36	4 42	2 36	2.37	1 02	46.47
Jefferson City	0 20	0.20	1.62	...	6 58	4 68	6.96	2.20	1 59	0.80	1.80	0 47	....
Kansas City	0.27	1 73	2.75	4 28	6 67	5 06	4.24	1 74	3.48	0 10	1.24	0.43	32 07
Keesees Ferry, Ar	0 50	4.20	3.75	8 33	5.27	5 60	4.75	3 02	4.03	0.92	2 51	2 20	45.04
Keokuk, Iowa	0.92	1 76	2.66	5 41	4 86	2 37	2 60	1.16	3.18	0 33	2.29	0.90	26 94
Keosaqua, Iowa	0 49	1.44	2.35	4.82	4.48	2.72	1.94	2 26	5 40	1 08	1.24	0.80	29.02
Kidder	T	0.84	....	....	.....	.....	.....	4.16	5.12	0 15	1.00	0.70	....
Lamar	0.48	0 89	2 60	10.56	3 43	4.05	2 31	2.06	5.96	0.07	1.48	0.46	34.30
Lamonte	0.42	1.31	2.15	8 57	7.18	3 90	9 74	0.91	2 37	0.70	1.86	0 31	39.42
Langdon	T	0.90	1.81	1.24	4 40	4 25	5.48	.....	.....	.....	0 80	.....	.....
LaPlata	....	.....	.....	.....	.....	.....	.....	.....	3 66	2 62	1.84	0.91	.....
Leavenworth, Kas	0.10	1.69	2 67	3.85	5 83	5.64	6.92	3.61	4.62	0 48	...	...	...
Lebanon	0 35	2.34	3.86	13.17	5 76	2 89	5.67	2 35	4.58	0.53	1.51	1 25	43.76
Lexington	0.32	0.98	1 78	6 77	6 21	2 45	13.30	1 86	3.37	9.06	1.78	0.15	51.98
Liberty	0.15	1.79	3.66	5.23	5.95	.....	.....	2.39	4.12	0.17	1.12	0.79	.....
Linn Creek	0.20	1.78	.....	....	.....	.....	.....	.....	.....	0.23	1.17	0.80	.....
Louisiana	0.00	1.60	.....	7.77	5.07	3 84	2 70	1.35	1.55	....	.....	0.18	.....
Malden	.....	1.05	3.20	8.45	12.10	8.30	1.60	0.80	.....	.....	.....	.....	.....

MONTHLY AND ANNUAL PRECIPITATION—CONTINUED.

Station.	January	February	March	April	May	June	July	August	September	October	November	December	Annual
Mansfield	0 35	2 17	3 88	9 93	6.12	2 58	2 75	3 92	.....	.....	.....	.....	.....
Marble Hill	0.39	4 54	2 68	8.85	8.15	....	....	....	.....	....	2.75	....	.....
Marceline	....	....	....	5.75	5 49	5 57	6.42	1.85	3.96	0.73	2.11	0 70	.....
Marshall	0 40	1.23	2 21	6.39	6 20	4.49	10 85	0 79	3 65	0.49	1.94	0 25	38.29
Mascoutah, Ill	0 74	2 43	3.50	10.20	4 20	2.80	2 50	1.60	5.70	3 00	1 60	0 60	38 57
McCune Station	0.85	3.44	3 50	7.84	4.04	4 31	3 43	0 69	2.11	0.38	1.08	0.33	32 00
Mexico	0 74	2.04	2 68	8 46	8 51	6 70	3.38	1 24	2 41	0 44	.....	...	.....
Miami	0.92	1.50	3 25	6 93	5 84	6.52	5 33	0.76	2 57	0 57	..	...	...
Mine LaMotte	0 11	2 94	3 81	7.98	6.51	5 57	1.68	0 75	4.02	1.49	1.73	1.00	37.09
Mound City	0 20	1 33	1.62	...	...	...	...	...	...	...	.....	...	.....
Mount Vernon	0.07	2.28	2.22	6 37	3 80	3 99	2.18	2.87	6 92	1 51	.....	0.50	.....
Neosho	0.55	2.27	2 45	9 00	4.92	2 46	4 57	.....	4.46	...	...	1.65	.....
New Boston	0.08	1.89	2.32	6.12	8 45	7 01	3 22	.....	3 53	0 54	1 44	...	...
New Hartford	0 46	2.84	3 45	8.68	7 35	5 95	2 47	0.50	3 03	0 35	1 26	0 53	36 88
New Haven	0 78	1 68	3.13	10.38	5 99	6 30	3.54	1.48	2.59	0.60	1 38	1.15	39 00
New Madrid	...	...	...	.....	...	...	...	1.15	6.10	4.49	3.59	2.17	...
New Palestine	0 13	0 60	2 29	8 88	4 59	6.73	9 75	1 01	1 34	1 12	1 71	0 10	38.25
Oakfield	0 34	2.26	5 02	11.08	7 11	3 07	3 48	1 08	3 38	0 86	1 59	1.03	40 30
Oakridge	0 40	2.75	2.80	8 83	6.50	4 30	3 30	0.90	4.10	0 63	1 40	1 71	34 62
Olathe, Kas.	...	...	...	.....	...	4.26	4.39	1.39	3 48	0 15	.	0.41	..
Olden	0.26	3 97	4 23	7.04	5 48	4 53	5 80	1 96	3.77	1.10	2 74	1.66	43 49
Oregon *(a)*	0.35	1 37	2 32	3 12	3.25	3.36	6 61	6 11	4.84	0 15	1 06	0.89	33 41
Oregon *(b)*	0.35	1.07	2.07	3 02	3.15	3.49	6.60	5.80	4.70	0 33	1.15	0.95	32 68
Osceola	.....	...	...	11.43	6.58	4 63	4 12	0 79	4 32	0 87	1.52	...	.....
Oto	.....	1.81	3.60	8.20	4 29	2 80	2 35	0 00	4.29	...	.....	0 75	.....
Palmyra	0.65	2.85	2.85	6 50	7 75	4 15	2 50	1.50	2.10	0.50	1 40	0.70	38.45
Panacea	...	...	...	10 89	5 00	2.28	3 49	3.00	2.87	0 79	1.86	1.92	.....
Paris	0 85	2 90	3 77	3 50	6 52	...	2.74	...	...	...	...	...	...
Phillipsburg	0.40	1.40	1.87	8 93	5 07	2 82	4.72	2 35	6 52	1.28	1.54	0 50	37 40
Pickering	0 30	1.55	1 81	3.71	4 05	3.93	7.87	5 55	5 94	...	1.12	1.20	.....
Platte River	0 30	1.46	2 17	3.36	5.15	5 95	9.76	3.47	4 51	0.16	0.73	0 39	37.42
Poplar Bluff	0 28	5 08	3.29	10 97	9 11	....	....	.....	...	...	...	...	.....
Potosi	...	...	...	...	...	...	...	.....	5.74	0.77	1.02	1.18	.....
Princeton	0 35	1.86	2 28	5 46	4.12	4 95	5 78	3 54	4 82	0.35	0.70	1 27	35 48
Quincy, Ill	0 52	2.92	...	6 14	7.59	4 09	1 23	1 60	1 63	0.38	1 24	0.25	.....
Rea	0.20	0.80	1.95	3.45	5 13	5 58	4 60	6 63	3 68	...	...	...	...
Rolla	0 42	1.75	3 67	11.71	5 92	5 31	5 09	2 23	5 68	1 10	1.87	1.48	46.15
Round Spring	...	...	2 36	9 77	5 03	3.68	4 25	0 96	6.28	.	2 84	1.16	...
St. Charles	0.34	3.37	3 18	11.01	5.91	3 27	3.76	1.03	3.14	0 69	1 58	0.89	38 21
St. Joseph	0.30	1.53	1 50	3 18	3.80	2 35	7 61	5.81	3 35	0 37	0.72	...	...
St. Louis *(a)*	0 33	2 98	5.10	10 84	5 42	3 49	2 49	0.65	3 69	1.66	1.36	1.32	39 33
St. Louis *(b)*	0.19	2.65	4.67	11.34	5.85	4.34	3.53	1.06	3 50	1 64	1 56	1 29	41.62
Sarcoxie	.....	...	...	...	...	...	2 99	2 93	3.87	2 06	1.58	1.11	...
Sedalia	0.64	1 63	2 67	10 06	7.09	3.40	10 21	1.29	1 86	0 88	2.15	0.87	42.76
Shelbina	0.06	4.50	3 70	6 50	6.50	5 50	4 50	1.50	2 50	0.70	1.20	0 30	37 47
Springfield	0 34	2.19	3.02	8.32	5 69	4 49	5.69	1.11	5 91	1 15	1.54	0.99	48.55
Stanberry	0 29	1.48	2 34	4 49	4.62	4.46	4 28	.....	...	...	...	...	...
Steelville	0.28	1.56	3 59	12 05	7.67	7.06	5 75	0 86	7 09	0 23	2 70	1 62	50 46
Steffenville	0 70	2 55	2.43	7 80	8 08	4 74	2.21	1.90	1 97	1.03	1 70	1.66	36.77
Stellada	0 30	0 87	2 43	8 77	8.52	4.19	7 76	1.19	2.57	1 15	1 45	0 22	39.42
Sublett	0 32	3.15	2e79	8 21	6 50	2 94	3 05	3 77	4 10	0.84	....	.....	.....
Tindall	....	.....	...	.....	...	...	...	3 03	4 74	0 00	..	...	.....
Unionville	.....	...	1.67	5.99	4.89	2.71	3 22	4.22	3 91	0 11	0 50	0 63	.....
VanCleve	0.28	0 30	4.20	...	...	...	5 00	2 04	4 00	1.40	0 08	3 23	...
Vermont	0 56	2 14	1 01	10.77	6.03	5 13	10.43	1 33	0 89	1.27	1 86	0 31	42.63
Vilas	.....	.....	.....	.....	...	...	5.61	5 21	5.15	0 06	0.88	0 64	.....
Virgil City	....	0.96	2.60	9 21	4.07	3 40	2 48	1 80	4.34	0 23	1 65	....	.....
Warrensburg	0.41	...	...	7 07	6 36	...	9 80	0 91	2.44	0 75	1 74	...	.....
Warrenton	0 44	3 50	3 58	10.74	6 39	6 59	3 37	1 44	3 56	0 56	1.44	1.14	42 75
Warsaw, Ill	0.40	1 66	.....	5 25	3 47	1 59	0 88	0.95	1 77	0.22	0.77	1.08	.....
Wellsville	0.15	0 70	4 34	....	8.58	...	....	....	.....	.....	.....	.....	.....
West Plains	0 00	1.86	...	6 72	4 05	2 75	...	...	...	...	...	.....	...
Wheatland	0.13	1.08	3 94	12 61	5.46	4 20	5.78	0.20	4 07	1.18	1.54	0 90	40.99
Whiteside	0 36	1.30	4 49	10 42	...	.....	2.72	0 61	3 13	0 40	1.30	....	.....
Number Stations	1 13	1 17	1 10	1 18	1 19	1 13	1 18	1 22	1 21	1 11	1 07	1 03	.....
Monthly mean	0.45	1.98	2.86	7.84	5 89	4.61	4 91	2 20	3.92	0 99	1.59	0 95	38 19

SPECIMEN CROP BULLETINS.

The following are specimen copies of the Weekly Crop Bulletin issued from this office during the entire crop season of 1893. These three are selected, as they indicate the conditions for the principal growing period, from May to August:

Bulletin No. 5, Issued May 9, 1893.

The past week has been much like the three preceding—too cold, cloudy and wet to permit any material advancement in farm work, and decidedly detrimental to garden vegetables and early planted corn.

The deficiency in temperature ranged from three degrees in the southern to ten degrees in the northern portion, while the precipitation was badly distributed, and ranged from a deficiency of a half inch in some of the northern to an excess of three inches in some of the southern counties. The ground is still cold and wet. Much seed is rotting, and even with the most favorable weather advantageous work will be impossible for some days.

Wheat has improved, except on land adjacent to small streams, where it is submerged and showing the bad effect of continued wet. Oats are generally a thin stand and of bad color. Meadows and pastures have made slow growth, but are improving. Nearly all the corn planted three weeks ago will have to be replanted, and very few counties report any material work done with this crop as yet.

In the southwest peaches seem to have been almost all killed, but in the rest of the State apples suffered more, and the conditions are favorable for a very light crop. Pears, cherries, plums, raspberries and strawberries promise well, but blackberries are almost destroyed. Grapes are not well enough advanced to determine the injury.

Several destructive hail and wind-storms visited different sections of the State during the week, and rains so heavy as to destroy fences, bridges and railroad tracks did irreparable injury by washing.

Bulletin No. 10, Issued June 13, 1893.

The rain-fall for the week occurred during the first two days, with the exception of a few scattering showers on Saturday. Some localities report no precipitation whatever, but cool nights and heavy dews have done much to cancel all detrimental effects.

The temperature averaged considerably above the normal, especially during the last three days, except in a few of the southern counties, and the sunshine was excessive and in some cases detrimental to the best interests of agriculture.

Great progress was made during the week, in all farm work. The rapid improvement in vegetation has made the outlook for a good harvest more hopeful, and raised the hopes of the farmers accordingly.

Corn-planting is finished, except in low or poorly drained localities, the early plant is coming on in fine shape and cultivation is general; though the general prospect for the crop is not the most favorable, it is not nearly so bad as last year, when, in spite of all, the yield was very fair.

Wheat has been slightly injured by high winds and heavy rains in previous weeks, and has not fully recovered. Much grass is also reported as growing among it, and chinch-bugs developing cheat are still working unfavorably. With seasonable weather from now till harvest time, the yield should reach 75 per cent, as a conservative figure.

Oats and grasses have improved rapidly under the prevailing conditions of the last seven days, and all agree that these crops never looked more promising. Clover is not as good as could be wished, but the hay-crop is practically assured, and pasturage is rich and abundant.

Garden crops are generally in good condition, though worked very little as yet. The smaller fruits are generally an excellent crop. Strawberries have matured in all sections, and raspberries are ripening in southern counties. Peaches are reported as promising better than was expected some two weeks ago, and over half a crop will undoubtedly be harvested. Potatoes show a fair condition and an acreage of over 100 per cent. Apples promise the poorest crop of anything so far noted.

Plenty of sunshine, a high temperature and a few well-timed showers would do much to advance agricultural interests, during the next ten days.

Bulletin No. 19, Issued August 15, 1893.

Upon the whole, conditions have been more favorable during the past week than for several weeks preceding. Showers have refreshed vegetation, farmers were working with renewed vigor, and the general outlook has improved decidedly.

Seasonable August weather prevailed during the first of the week, but the last two days were a decided exception—northerly winds prevailing, and temperature ranging much below the average.

In spite of the cool wave, the mean temperature for the week averaged slightly above the normal.

The rain which occurred on the night of the 10th was well distributed—nearly every county reporting more or less of a fall—and in sections it came in the nick of time to relieve threatened anxiety, as crops and stock were beginning to feel seriously the lack of sufficient moisture.

In scattered counties the fall was very heavy, two or three inches being reported.

Although the general fall was in the vicinity of one inch, the partly cloudy and exceptionally cool weather that characterized the three following days kept the moisture from being evaporated, allowed of its complete absorption by the vegetation and ground, and thereby greatly increased its intrinsic value.

Abundant sunshine prevailed for all purposes.

No particular changes outside of the general improvement and those naturally attending the advance of the season are to be noted.

Haying is generally finished; stacking and threshing are done in south and progressing in north portion, and plowing for wheat is being pushed where condition of ground will permit.

Corn prospects continue the brightest in years. Fruit, grapes excepted, is quite the opposite.

SHIPMENTS OF AGRICULTURAL PRODUCTS
1893.

REPORT OF SHIPMENTS.

(BY COUNTIES.)

It was with some hesitancy that we undertook to collect a statement of the shipments of surplus commodities from this State for 1893. The work had never been attempted by this Department before. The clerical force was sufficient only for the work of the office as heretofore conducted. No appropriation had been made our Board for this purpose, and there was no fund in which there was a surplus and upon which we might draw without impairing the work in other directions.

But having no doubt of the necessity of a work that would show the products of our farms not consumed at home, the value of which represents, to a certain extent, the ability of an agricultural state to purchase the commodities of other localities, and at the same time indicates very clearly the existing agricultural conditions, we have collected, as best we could without money and under the circumstances, and now report by counties, the following statement of shipments for 1893.

It is not expected that this statement is absolutely correct. In some instances we have obtained from railroad companies only car-load shipments, leaving unaccounted for the vast amount of poultry, eggs, butter and other farm produce shipped in smaller quantities. Again, river counties have shipped much of their produce by tramp boats that were operated on Missouri waters during the summer of 1893, moved south upon the approach of winter, and we are now unable to locate them. Had there been an appropriation sufficient to have enabled us to send a clerk to these counties, we would no doubt have been able, in many instances, to find some representative of these boats who could have reported many shipments that we have been otherwise unable to obtain.

The reports from transportation companies were not uniform in character. Some reported shipments in pounds, some in tons, some in car-load lots, and others as we called for it in our blanks.

Live-stock reported by tons, pounds or car-load lots have been estimated and reported by us by the head, we approximating the number as near as possible under the circumstances.

We might suggest here that should the Legislature deem it advisable to continue the collection of this information, it would be well to enact a law providing for reports uniform in character, and fixing a time in which transportation companies should forward same to this office.

The counties of Cedar, Dallas, Douglas, Hickory, Maries, Ozark, Pemiscot, Ste. Genevieve, Stone and Taney have no railroads, and we have been unable to obtain reports from Reynolds. The products of these counties are no doubt credited to other counties.

The statement of per cent of land in cultivation, the remainder that could be profitably enclosed, the increase of enclosed or cultivated land in the last 10 years, swamp land, timber, principal productions, live-stock, minerals, topography, etc., is an estimate by our crop correspondents, and should be considered only as approximating the facts. We feel confident it will serve as a better answer to the many queries received at this office than we would otherwise be able to make, and perhaps as correct as will be given until by law we shall have provided for and made an agricultural survey of the State.

The transportation companies have evinced a deep interest in the development of our agricultural industries, have furnished us the information necessary in compiling this statement as promptly as the circumstances would permit; and for their kind and courteous treatment we feel grateful.

ADAIR.

Land, per cent in cultivation and pasture	85
of remainder that could be profitably enclosed	75
enclosed and cultivated has increased in last 10 years	25
that is swamp or wet	3
of swamp or wet that could be reclaimed by drainage	85
in commercial timber	5

Principal agricultural productions, corn, wheat, oats, hay.

Principal live-stock, cattle and hogs.

Minerals, coal.

Minerals developed, coal.

Topography, one-half broken to rolling, remainder undulating prairie.

SHIPMENTS.

Cattle, hd	4,358	Hungarian seed, bus	800
Hogs, hd	16,187	Grapes, bas	36
Horses, hd	414	Peaches, crates	272
Sheep, hd	2,800	Berries, crates	27
Mixed stock, cars	7	Apples, brls	115
Blood hogs, hd	11	Dried fruit, lbs	1,775
Provisions, lbs	105,370	Game, lbs	1,880
Wheat, bus	16,774	Tallow, lbs	4,000
Corn, bus	12,264	Poultry, lbs	92,662
Oats, bus	55,237	Eggs, doz	137,732
Rye, bus	821	Butter, lbs	102,256
Mixed grain, bus	2,400	Hides, lbs	53,720
Hay, tons	776	Lumber, cars	8
Potatoes, brls	676	Ties, cars	141
Wool, lbs	29,705	Brick, cars	5
Flour, lbs	167,005	Stone, cars	2
Beeswax, lbs	1,000	Wood, cars	56
Sorghum, galls	172	Hoops, cars	45
Furs, lbs	1,542	Coal, cars	623
Feathers, lbs	1,620	Junk, cars	3
Bread, lbs	24,240	Miscellaneous, lbs	10,650
Timothy seed, bus	1,123		

ANDREW.

Land, per cent in cultivation and pasture	94
of remainder that coald be profitably enclosed	50
enclosed and cultivated has increased in last 10 years	18
that is swamp or wet	3
of swamp or wet that could be reclaimed by drainage	90
in commercial timber	5

Principal agricultural productions, corn, wheat, oats, grass.

Principal live-stock, hogs, cattle, horses, sheep.

Topography, undulating upland, level bottoms.

SHIPMENTS.

Cattle, hd	7,786	Veal, lbs	3,105
Hogs, hd	22,259	Game and fish, lbs	305
Horses, hd	300	Lard, lbs	720
Sheep, hd	300	Poultry, lbs	62,745
Mixed stock, cars	27	Eggs, doz	50,351
Wheat, bus	15,305	Butter, lbs	18,468
Corn, bus	37,672	Cheese, lbs	32,572
Oats, bus	5,543	Dairy products, lbs	20,000
Mixed grain, cars	2	Feathers, lbs	175
Provisions, lbs	19,967	Garden seed, lbs	420
Flour, lbs	425,500	Cane, lbs	5,200
Shipstuff, lbs	87,750	Lumber, cars	6
Nursery stock, lbs	250	Logs, cars	34
Peaches, crates	247	Wood, cars	257
Berries, crates	339	Brick, car	1
Cherries, crates	70	Coal, cars	2
Apples, brls	354	Stone, cars	28
Dried fruit, lbs	139	Other cars	66
Wine, galls	40	Miscellaneous, lbs	280,600
Beef, lbs	600		

ATCHISON.

Land, per cent in cultivation and pasture	80
of remainder that could be profitably enclosed	33
enclosed and cultivated has increased in last 10 years	50
that is swamp or wet	5
of swamp or wet that could be reclaimed by drainage	100
in commercial timber	5

Principal agricultural productions, corn, oats, wheat.

Principal live-stock, hogs, cattle.

Minerals, coal.

Minerals developed, coal.

Topography, level to rolling.

SHIPMENTS.

Cattle, hd	39,094	Game, lbs	850
Hogs, hd	52,817	Fish, lbs	938
Horses, hd	480	Butter, lbs	3,488
Sheep, hd	800	Poultry, lbs	36,275
Mixed stock, cars	11	Eggs, doz	6,336
Wheat, bus	204,803	Feathers, lbs	1,040
Corn, bus	329,602	Brick, cars	21
Oats, bus	31,200	Junk, cars	8
Mixed grain, car	1	Ice, cars	3
Honey, lbs	400	Tile, cars	2
Beeswax, lbs	50	Lumber, cars	2
Apples, brls	267	Wood, car	1
Dried fruit, lbs	986	Other cars	14
Beer, galls	3,003	Miscellaneous, lbs	990,570
Veal, lbs	800		

AUDRAIN.

Land, per cent in cultivation and pasture	10
enclosed and cultivated has increased in last 10 years	27

Principal agricultural productions, corn, oats, wheat, grass.

Principal live-stock, cattle, hogs, horses.

Minerals, coal, fire-clay.

Minerals developed, coal, fire-clay.

Topography, level to undulating.

SHIPMENTS.

Cattle, hd	16,447	Tallow, lbs	9,230
Hogs, hd	36,082	Poultry, lbs	220,324
Horses, hd	1,667	Eggs, doz	62,000
Sheep, hd	17,067	Butter, lbs	2,166
Blood horses, hd	65	Feathers, lbs	4,070
Mixed live-stock, cars	6	Lumber, cars	5
Wheat, bus	6,564	Logs, car	1
Corn, bus	3,102	Hoops, cars	17
Oats, bus	364,994	Brick, cars	1,200
Hay, tons	1,696	Tiling, cars	382
Wool, lbs	122,810	Stone, cars	3
Pelts, lbs	5,900	Coal, cars	1,979
Hides, lbs	159,465	Junk, cars	7
Nuts, bus	11,400	Clay, cars	20
Flour, lbs	2,817,733	Miscellaneous, cars	135
Shipstuff, lbs	118,600		

BARRY.

Land, per cent in cultivation and pasture	45
of remainder that could be profitably enclosed	75
enclosed and cultivated has increased in last 10 years	58
in commercial timber	30

Principal agricultural productions, wheat, corn, grass, fruit.

Principal live-stock, hogs, cattle.

Minerals, lead and zinc.

developed, lead and zinc.

Topography, rolling, broken.

SHIPMENTS.

Cattle, hd	1,369	Poultry, lbs	181,843
Hogs, hd	3,040	Eggs, doz	229,885
Horses, hd	100	Butter, lbs	2,448
Sheep, hd	300	Feathers, lbs	1,353
Blood horses, hd	1	Game, lbs	10,891
Mixed stock, cars	15	Lumber, cars	79
Provisions, lbs	60,000	Ties, cars	72
Wheat, bus	141,645	Wood, car	1
Corn, bus	505	Saw-dust,	6
Potatoes, brls	1,375	Sand, cars	3
Hides, lbs	29,713	Brick, cars	3
Flour, lbs	1,274,868	Junk, cars	6
Apples, brls	338	Other cars	1
Lard, lbs	5,780	Miscellaneous, lbs	140,140

BARTON.

Land, per cent in cultivation and pasture	95
of remainder that could be profitably enclosed	100
enclosed and cultivated has increased in last 10 years	50

Principal agricultural productions, corn, wheat, oats, fruit.

Principal live-stock, cattle, hogs.

Minerals, coal in great abundance.

Topography, undulating.

SHIPMENTS.

Cattle, hd	6,018	Nursery stock, trees	1,000
Hogs, hd	25,175	Plums, crates	100
Horses, hd	840	Raspberries, crates	224
Sheep, hd	830	Blackberries, crates	1,262
Blood cattle, hd	1	Strawberries, crates	651
Blood sheep, hd	85	Cherries, crates	10
Blood hogs, hd	38	Gooseberries, crates	10
Mixed stock, cars	13	Game, lbs	22,638
Wheat, bus	64,000	Veal, lbs	350
Corn, bus	14,257	Poultry, lbs	189,755
Oats, bus	36,336	Eggs, doz.	32,410
Hay, tons	16,600	Butter, lbs	9,992
Mixed grain, car	1	Dairy products, lbs	40,214
Wool, lbs	1,934	Lumber, cars	3
Hides, lbs	84,426	Cord-wood, cars	65
Feathers, lbs	1,627	Junk, car	1
Tallow, lbs	3,465	Sand, cars	3
Pelts, lbs	300	Miscellaneous, cars	238
Flour, lbs	2,159,500	Stone, cars	276
Millet seed, lbs	6,073	Coal, cars	1,644
Flax, bus	29,096	Iron-ore, cars	4
Castor beans, bus	1,000	Farm products, lbs	4,770,000

BATES.

Land, per cent in cultivation and pasture	95
of remainder that could be profitably enclosed	95
enclosed and cultivated has increased in last 10 years	35
that is swamp or wet	7
of swamp that can be reclaimed by drainage	97
in commercial timber	6

Principal agricultural productions, grass, corn, wheat, oats, fruit.

Principal live-stock, cattle, hogs, horses.

Minerals, coal.

Minerals developed, coal.

Topography, undulating.

SHIPMENTS.

Cattle, hd	17,252	Apples, brls	250
Hogs, hd	43,977	Pie plant, lbs	7,765
Horses, hd	1,420	Brooms, lbs	1,760
Sheep, hd	520	Leather, lbs	5,560
Blood horses, hd	31	Tallow, lbs	24,030
Mixed live-stock, cars	16	Veal, lbs	2,460
Provisions, lbs	12,000	Game, lbs	110
Wheat, bus	172,967	Poultry, lbs	348,319
Corn, bus	302,980	Eggs, doz	294,179
Oats, bus	145,221	Butter, lbs	27,615
Mixed grain, cars	119	Feathers, lbs	1,865
Flax, cars	73	Cheese, lbs	9,865
Broom-corn, bales	160	Timothy seed, bus	440
Hay, tons	10,670	Clover seed, bus	350
Potatoes, bbls	199	Garden seed, lbs	40
Wool, lbs	3,725	Lumber, cars	114
Hides, lbs	127,343	Logs, cars	8
Nuts, bus	161	Wood, cars	168
Flour, lbs	10,469,530	Brick, cars	48
Shipstuff, lbs	58,505	Tiling, cars	4
Nursery stock, lbs	35,290	Coal, cars	38,874
Onions, bus	278	Pottery, lbs	4,835
Pop-corn, bus	31	Junk, cars	17
Blackberries, crates	414	Ties, cars	4
Dried peaches, lbs	520	Farm produce, lbs	22,004
Wine, galls	34	Other cars,	38
Vegetables, lbs	60,565	Miscellaneous, lbs	2,924,785

BENTON.

Land, per cent in cultivation and pasture	75
of remainder that could be profitably enclosed	30
in commercial timber	25

Principal agricultural productions, corn, oats, grass.

Principal live-stock, hogs and cattle.

Minerals, lead.

Topography, undulating to broken.

SHIPMENTS.

Cattle, hd	4,586	Butter, lbs	3,875
Hogs, hd	23,280	Eggs, doz	354,117
Horses, hd	20	Poultry, lbs	116,670
Sheep, hd	2,480	Wool, lbs	24,147
Mixed live-stock, cars	45	Stone, cars	3
Wheat, bus	11,200	Wood, cars	107
Oats, bus	1,600	Posts, cars	2
Hay, tons	80	Hoops, cars	24
Corn-meal, lbs	9,100	Lumber, cars	24
Flax-seed, bus	80,000	Ties, cars	141
Flour, bus	51,828	Junk, cars	2
Hides, lbs	84,515	Other cars	2
Tallow, lbs	1,462		

BOLLINGER.

Land, per cent in cultivation and pasture	35
of remainder that could be profitably enclosed	42
enclosed and cultivated has increased in last 10 years	15
that is swamp or wet	11
of swamp that can be reclaimed by drainage	60
in commercial timber	45

Principal agricultural productions, corn, wheat, oats, barley, hay, fruit.

Principal live-stock, hogs, cattle, horses.

Minerals, iron, indications of lead and zinc, kaolin.

Mineral developed, kaolin.

Topography, broken, small per cent level.

SHIPMENTS.

Cattle, hd	616	Tomatoes, crates	32
Hogs, hd	3,520	Apples, brls	6
Horses, hd	40	Strawberries, crates	438
Sheep, hd	480	Butter, lbs	229
Mixed stock, cars	28	Poultry, lbs	73,642
Wheat, bus	35,200	Eggs, doz	79,110
Corn, bus	800	Lumber, cars	142
Furs, lbs	157	Stone, car	1
Feathers, lbs	529	Hoops, cars	5
Game, lbs	161	Junk, car	1
Provisions, lbs	22,856	Staves, cars	265
Wool, lbs	5,947	Ties, cars	336
Hides, lbs	6,717	Clay, cars	7
Molasses, galls	737	Logs, cars	11
Venison, lbs	475	Cooperage, cars	8
Clover seed, lbs	3,506	Stave bolts, cars	8
Dried fruit, lbs	2,341	Piling, car	1
Peaches, crates	155	Other cars	5
Plums, crates	19		

BOONE.

Land, per cent in cultivation and pasture	82
of remainder that could be profitably enclosed	75
enclosed and cultivated has increased in last 10 years	20
in commercial timber	10

Principal agricultural production, corn, wheat, oats, grass.

Principal live-stock, cattle, hogs, horses.

Minerals, coal.

Mineral developed, coal.

Topography, undulating.

SHIPMENTS.

Cattle, hd	6,087	Eggs, doz	135,550
Hogs, hd	28,027	Butter, lbs	3,569
Horses, hd	1,258	Feathers, lbs	4,638
Jacks and jennets, hd	52	Timothy-seed, bus	46
Sheep, hd	8,499	Clover, bus	657
Mixed stock, cars	16	Furs, lbs	60
Wheat, bus	78,188	Brooms, lbs	26,355
Oats, bus	875	Whisky, brls	33
Hay, tons	38	Lumber, cars	122
Wool, lbs	73,450	Logs, cars	8
Pelts, lbs	7,540	Ties, cars	323
Hides, lbs	133,915	Hoops, cars	79
Nuts, bus	1,158	Wood, car	1
Flour, lbs	340,931	Brick, car	1
Shipstuff, lbs	25,790	Coal, car	1
Pop-corn, bus	1,000	Tar, car	1
Dried fruit, lbs	50	Junk, cars	10
Game, lbs	275	Sand, cars	11
Tallow, lbs	20,465	Other cars	21
Poultry, lbs	531,672	Miscellaneous, lbs	1,097,808

No report of shipments from Centralia over the Wabash could be obtained.

BUCHANAN.

Land, per cent in cultivation and pasture	90
of remainder that could be profitably enclosed	98
enclosed and cultivated has increased in last 10 years	25
that is swamp or wet	6
of swamp or wet that could be reclaimed by drainage	95
in commercial timber	10

Principal agricultural productions, wheat, corn, grass.

Principal live-stock, hogs, cattle.

Topography, rolling, some level bottoms.

SHIPMENTS.

Cattle, hd	2,924	Strawberries, crates	1,868
Hogs, hd	29,189	Melons, car	1
Horses, hd	1,380	Apples, brls	520
Sheep, hd	1,875	Dried fruit, lbs	270,000
Blood horses, hd	3	Wine, galls	25,000
Blood sheep, hd	10	Beef, lbs	1,550
Blood hogs, hd	43	Pork, lbs	991,675
Wheat, bus	583,806	Fish, lbs	4,900
Corn, bus	2,676,405	Lard, lbs	600
Oats, bus	117,403	Tallow, lbs	2,400
Barley, bus	22,079	Poultry, lbs	185,038
Rye, bus	19,189	Eggs, doz	87,775
Hay, tons	408	Butter, lbs	3,563
Straw, tons	48	Milk, galls	210
Potatoes, brls	4,115	Feathers, lbs	1,600
Pelts, lbs	2,300	Lumber, cars	947
Hides, lbs	685,280	Logs, cars	42
Flour, lbs	21,229,175	Wood, cars	110
Shipstuff, lbs	2,775,700	Hoops, car	1
Corn-meal, lbs	5,520	Sawdust, cars	2
Nursery stock, lbs	104,899	Shingles, cars	40
Beans, crates	1,000	Brick, cars	1,344
Peas, crates	600	Stone, cars	33
Onions, bus	11	Iron, cars	6
Molasses, galls	63,209	Lime, cars	17
Cucumbers, crates	150	Coal, cars	34
Tomatoes, crates	800	Junk, cars	44
Peaches, crates	1,504	Clay, car	1
Raspberries, crates	3,008	Sand, cars	13
Blackberries, crates	2,000	Miscellaneous, lbs	7,161,887

Much of the agricultural produce of Buchanan county was no doubt taken over country roads to and consumed in St. Joseph. We have endeavored to report only shipments originating in and supposed to be the produce of the county, but some of the railroads entering St. Joseph have furnished us reports in bulk from their Auditor's office, and it is possible that in some few instances shipments are given that did not originate in the county.

BUTLER.

Land, per cent in cultivation and pasture	25
of remainder that could be profitably enclosed	75
enclosed and cultivated has increased in last 10 years	25
that is swamp or wet	15
of swamp that can be reclaimed by drainage	100
in commercial timber	55

Principal agricultural productions, corn, wheat, oats, fruit.

Principal live-stock, cattle, hogs, horses.

Minerals, Iron.

Topography, broken in north to level in south part.

SHIPMENTS.

Cattle, hd	924	Feathers, lbs	218
Hogs, hd	1,928	Oak lumber, cars	917
Mixed live-stock, cars	6	Ties, cars	31
Blood cattle, hd	1	Staves, cars	831
Blood hogs, hd	1	Piling, cars	181
Corn, bus	3,200	Woodenware, cars	14
Peaches, crates	424	Machinery, car	1
Venison, lbs	550	Shaved hoops, car	1
Poultry, lbs	606	Walnut lumber, car	1
Wool, lbs	500	Other cars	10
Eggs, doz	5,600		

CALDWELL.

Land, per cent in cultivation and pasture	90
of remainder that could be profitably enclosed	100
enclosed and cultivated has increased in last 10 years	15

Principal agricultural productions, corn, grass.

Principal live-stock, hogs, cattle.

Minerals, coal.

Minerals developed, coal.

Topography, undulating, broken along streams.

SHIPMENTS.

Cattle, hd	13,882	Peaches, crates	202
Hogs, hd	41,033	Berries, crates	133
Horses, hd	960	Molasses, galls	300
Sheep, hd	3,925	Wine, galls	40
Mixed stock, cars	2	Tallow, lbs	2,595
Blood hogs, hd	3	Lard, lbs	90
Wheat, bus	6,042	Poultry, lbs	429,618
Corn, bus	30,877	Eggs, doz	151,265
Oats, bus	10,921	Butter, lbs	45,349
Broom-corn, bales	28	Feathers, lbs	805
Hay, tons	530	Seeds, bus	1,200
Potatoes, brls	20	Lumber, car	1
Wool, lbs	37,436	Logs, cars	8
Hides, lbs	81,290	Wood, cars	9
Pelts, lbs	757	Brick, car	1
Nuts, bus	50	Coal, cars	521
Flour, lbs	332,686	Junk, cars	4
Shipstuff, lbs	194,260	Fruit, car	1
Corn-meal, lbs	7,370	Stone, cars	59
Beeswax, lbs	1,235	Other cars	2
Onions, bus	232	Miscellaneous, lbs	19,040,000
Apples, brls	22		

CALLAWAY.

Land, per cent in cultivation and pasture	80
of remainder that could be profitably enclosed	80
enclosed and cultivated has increased in last 10 years	13
in commercial timber	12

Principal agricultural productions, corn, wheat, oats, grass.

Principal live-stock, cattle, mules.

Minerals, iron, coal, fire-clay.

Minerals developed, coal and fire-clay.

Topography, north half level, south broken.

SHIPMENTS.

Cattle, hd	4,784	Shipstuff, lbs	31,730
Hogs, hd	21,588	Poultry, lbs	19,830
Horses and mules, hd	486	Eggs, doz	28,126
Sheep, hd	9,341	Feathers, lbs	942
Mixed stock, cars	7	Nuts, bus	250
Provisions, lbs	13,695	Lumber, cars	15
Wheat, bus	38,699	Logs, car	1
Corn, bus	1,664	Staves, cars	23
Garden seed, lbs	640	Brick, cars	192
Clover seed, bus	710	Stone, car	1
Tobacco, lbs	2,000	Tiling, cars	348
Flax, cars	2	Lime, cars	801
Potatoes, brls	267	Junk, car	1
Wool, lbs	11,942	Other cars	6
Hides, lbs	5,852	Miscellaneous, lbs	5,230,956
Flour, lbs	374,947		

CAPE GIRARDEAU.

Lands, per cent in cultivation and pasture	75
of remainder that could be profitably enclosed	83
enclosed and cultivated that has increased in last 10 years	20
that is swamp or wet	6
of swamp that could be reclaimed by drainage	90
in commercial timber	20

Principal agricultural productions, wheat, corn, oats, clover-seed.

Principal live-stock, horses, hogs, cattle.

SHIPMENTS.

Cattle, hd	563	Furs, lbs	307
Hogs, hd	4,701	Lumber, cars	209
Horses, hd	140	Ties, cars	100
Sheep, hd	500	Logs, cars	36
Mixed live-stock, cars	7	Wood, cars	70
Provisions, lbs	7,237	Staves, cars	71
Wheat, bus	97,600	Stave-bolts, cars	140
Corn, bus	800	Hoops, cars	2
Hay, tons	40	Cooperage, cars	35
Potatoes, brls	800	Shingles, cars	2
Flour, lbs	56,258,802	Barrels, cars	3
Shipstuff, lbs	1,013,800	Brick, cars	14
Corn-meal, lbs	35,000	Stone, cars	3
Game, lbs	994	Granite, car	1
Poultry, lbs	72,859	Lime, cars	59
Eggs, doz	32,910	Clay, cars	24
Butter, lbs	2,277	Miscellaneous, cars	3
Feathers, lbs	176		

CAMDEN.

Land, per cent in cultivation and pasture	36
of remainder that could be profitably enclosed	90
in commercial timber	40

Principal agricultural productions, grass, corn, wheat.

Principal live-stock, cattle, hogs.

Minerals, lead, iron, zinc.

Minerals developed, lead.

Topography, rolling to broken.

SHIPMENTS.

Cattle, hd	621	Dried fruit, lbs	568
Hogs, hd	1,927	Game, lbs	21,525
Sheep, hd	126	Feathers, lbs	218
Mixed live-stock, cars	30	Eggs, doz	49,885
Wheat, bus	5,000	Butter, lbs	132
Wool, lbs	365	Hides, lbs	1,395
Poultry, lbs	15,917		

CARROLL.

Land, per cent in cultivation and pasture	90
of remainder that could be profitably enclosed	95
enclosed and cultivated has increased in last 10 years	25
that is swamp or wet	5
of swamp that could be reclaimed by drainage	50
in commercial timber	5

Principal agricultural productions, corn, wheat, grass.

Principal live-stock, cattle, hogs, horses, sheep.

Minerals, coal.

Minerals developed, coal.

Topography, rolling upland, level bottoms.

SHIPMENTS.

Cattle, hd	16,406	Peaches, crates	30
Hogs, hd	46,139	Apples, brls	428
Horses, hd	448	Strawberries, crates	191
Sheep, hd	1,948	Beef, lbs	326
Blood horses, hd	1	Game, lbs	7,500
Mixed stock, car	1	Tallow, lbs	21,900
Provisions, lbs	20,300	Poultry, lbs	536,537
Wheat, bus	1,005,671	Eggs, doz	117,730
Corn, bus	81,827	Butter, lbs	141,803
Oats, bus	17,263	Feathers, lbs	1,786
Rye, bus	607	Timothy seed, bus	814
Mixed grain, cars	6	Millet, bus	10
Hay, tons	27	Lumber, cars	96
Potatoes, brls	125	Wood, cars	9
Wool, lbs	5,980	Staves, cars	11
Hides, lbs	40,005	Saw-dust, cars	32
Furs, lbs	744	Tiling, cars	2
Nuts, bus	10	Brick, cars	3
Flour, lbs	4,546,800	Stone, cars	153
Snipstuff, lbs	252,580	Sand, cars	2
Corn-meal, lbs	78,860	Other cars	8
Onions, bus	3,248	Miscellaneous, lbs	321,447
Castor beans, lbs	6,980		

CARTER.

Land, per cent in cultivation and pasture	22
of remainder that could be profitably enclosed	50
enclosed and cultivated has increased in last 10 years	33
in commercial timber	40

Principal agricultural productions, clover, grass, wheat, fruit.

Principal live-stock, horses and cattle.

Mineral, iron.

Topography, broken.

SHIPMENTS.

Cattle, hd	167	Piling, cars	91
Hogs, hd	343	Logs, cars	3,057
Sheep, hd	500	Wood, cars	25
Hay, tons	10	Ties, cars	70
Flour, lbs	30,000	Miscellaneous, cars	18
Lumber, cars	3,948	Other cars	15

CASS.

Lands, per cent in cultivation and pasture	90
of remainder that could be profitably enclosed	90
enclosed and cultivated has increased in last 10 years	15
that is swamp or wet	3
of swamp that could be reclaimed by drainage	95
in commercial timber	4

Principal agricultural productions, corn, wheat, hay, fruit, flax.

Principal live-stock, cattle, hogs, horses, sheep.

Minerals, coal, fire-clay, sand and limestone.

Minerals developed, coal.

Topography, level to undulating.

SHIPMENTS.

Cattle, hd	12 967	Poultry, lbs	308,265
Hogs, hd	54,128	Eggs, doz	161,170
Horses, hd	3,660	Provisions, lbs	15,650
Sheep, hd	18,768	Butter, lbs	54,920
Mixed live-stock, cars	39	Feathers, lbs	1,011
Blood horses, hd	1	Timothy seed, bus	1,099
Blood hogs, hd	41	Clover seed, bus	133
Wheat, bus	176,343	Mixed seed, lbs	34,525
Corn, bus	189,970	Canned vegetables, lbs	613,870
Oats, bus	36,396	Cream, galls	5,075
Flax, cars	53	Milk, galls	511
Hay, tons	4,384	Salt, brls	1,530
Mixed grain, cars	28	Linseed oil, galls	15,325
Wool, lbs	4,828	Oil meal, lbs	71,915
Hides, lbs	137,703	Ice, cars	10
Pelts, lbs	696	Lumber, cars	20
Flour, lbs	564,135	Piling, cars	16
Shipstuff, lbs	133,835	Wood, cars	16
Nursery stock, lbs	1,700	Brick, cars	9
Onions, bus	1,606	Stone, cars	11
Vegetables, lbs	15,215	Lime, cars	7
Meal, lbs	1,903	Junk, cars	18
Flax straw, tons	22	Scrap iron, cars	2
Blackberries, crates	18	Coal, cars	2
Grapes, crates	1,102	Clay, car	1
Dried fruit, lbs	638	Shingles, cars	320
Game, lbs	5,744	Pottery, cars	2
Tallow, lbs	13,745	Miscellaneous, cars	684

CHARITON.

Land, per cent in cultivation and pasture	90
of remainder that could be profitably enclosed	95
enclosed and cultivated has increased in last 10 years	25
in commercial timber	10

Principal agricultural productions, corn, wheat, oats.

Principal live-stock, cattle.

Minerals, coal.

Minerals developed, coal.

Topography, rolling, some level bottoms.

SHIPMENTS.

Cattle, hd	9,241	Dried fruit, lbs	45
Hogs, hd	25,343	Whisky, galls	2,400
Horses, hd	513	Fish, lbs	671
Sheep, hd	3,288	Tallow, lbs	255
Blood horses, hd	2	Game, lbs	6,528
Blood cattle, hd	59	Poultry, lbs	48,787
Mixed live-stock, cars	6	Eggs, doz	146,905
Wheat, bus	194,109	Butter, lbs	12,604
Oats, bus	7,463	Clover seed, bus	600
Corn, bus	30,963	Feathers, lbs	180
Flax, cars	2	Timothy seed, bus	1,555
Mixed grain, cars	245	Cane seed, bus	1,600
Hay, tons	20	Lumber, cars	102
Tobacco, lbs	1,205,000	Logs, cars	7
Potatoes, brls	186,670	Wood, cars	60
Wool, lbs	16,116	Staves, cars	25
Hides, lbs	54,620	Sawdust, cars	3
Nuts, bus	353	Brick, cars	60
Flour, lbs	3,282,100	Stone, car	1
Shipstuff, lbs	40,000	Tiling, cars	10
Honey, lbs	100	Junk, cars	6
Onions, bus	3,500	Charcoal, car	1
Molasses, galls	1,400	Ice, car	1
Blackberries, crates	60	Other cars	10
Canned fruit, lbs	140,000	Miscellaneous, lbs	1,311,944

CHRISTIAN.

Land, per cent in cultivation and pasture	55
of remainder that could be profitably enclosed	66
enclosed and cultivated has increased in last 10 years	40
in commercial timber	27

Principal agricultural productions, corn, wheat, clover, timothy, fruit.

Principal live-stock, cattle, hogs, horses.

Minerals, lead and zinc.

Minerals developed, lead and zinc.

Topography, northwest undulating, southeast broken.

SHIPMENTS.

Cattle, hd	3,916	Dried fruit, lbs	2,014
Hogs, hd	24,376	Tallow, lbs	301
Horses, hd	100	Poultry, lbs	328,415
Sheep, hd	3,793	Eggs, doz	412,774
Mixed live-stock, hd	2,091	Butter, lbs	4,923
Wheat, bus	149,892	Cheese, lbs	100
Corn, bus	15,000	Feathers, lbs	2,345
Hay and straw, tons	18	Clover seed, bus	1,600
Wool, lbs	7,252	Lumber, cars	15
Tobacco, lbs	545	Ties, cars	764
Potatoes, brls	1,500	Wood, cars	433
Pelts, lbs	1,097	Logs, cars	2
Hides, lbs	14,043	Brick, cars	26
Nuts, bus	92	Stone, cars	9
Flour, lbs	327,445	Iron, cars	6
Shipstuff, lbs	60,000	Lead ore, cars	4
Corn-meal, lbs	3,000	Coal, cars	75
Beeswax, lbs	300	Pottery, cars	2
Onions, bus	10	Junk, clay, sand, cars	16
Cotton, bales	1,455	Miscellaneous, cars	8
Blackberries, crates	42		

CLARK.

Land, per cent in cultivation and pasture	93
of remainder that could be profitably enclosed	70
enclosed and cultivated has increased in last 10 years	30
that is swamp or wet	5
of swamp that could be reclaimed by drainage	50
in commercial timber	3

Principal agricultural productions, wheat, corn, oats, grass.

Principal live-stock, cattle, hogs, horses.

Minerals, coal and stone.

Minerals developed, coal.

Topography, undulating prairies, level bottoms.

SHIPMENTS.

Cattle, hd	3,941	Vinegar, galls	55,000
Hogs, hd	16,105	Melons, cars	4
Horses, hd	564	Berries, crates	22
Sheep, hd	3,480	Grapes, baskets	15
Blood horses, hd	25	Wine, galls	235
Blood cattle, hd	1	Cucumbers, bus	34,000
Blood hogs, hd	1	Beef, lbs	400
Mixed stock, cars	63	Pork, lbs	945
Provisions, lbs	3,200	Tallow, lbs	11,980
Wheat, bus	42,533	Game, lbs	390
Corn, bus	166,871	Poultry, lbs	483,482
Oats, bus	253,655	Eggs, doz	241,277
Rye, bus	1,394	Butter, lbs	24,351
Mixed grain, cars	7	Feathers, lbs	3,620
Hay, tons	1,380	Timothy seed, bus	1,766
Potatoes, brls	184	Millet, bus	572
Wool, lbs	20 880	Lumber, cars	207
Pelts, lbs	1,465	Ties, cars	97
Hides, lbs	41,005	Hoops, cars	18
Furs, lbs	147	Brick, cars	36
Nuts, bus	385	Junk, cars	9
Flour, lbs	2,714,640	Cooperage, cars	30
Shipstuff, lbs	800	Logs, cars	7
Corn-meal, lbs	500	Staves, car	1
Nursery stock, lbs	300	Posts, cars	3
Canned peas, cases	4,072	Coal, cars	2
Onions, bus	40	Lime, cars	5
Molasses, galls	1,005	Wood, cars	117
Pickles, cars	60	Sawdust, car	1
Tomatoes, cars	2	Stone, cars	8
Sweet corn, car	1	Other cars	4
		Miscellaneous, lbs	1,521,520

CLAY.

Land, per cent in cultivation and pasture	92
of remainder that could be profitably enclosed	95
enclosed and cultivated has increased in last 10 years	10
in commercial timber	5

Principal agricultural productions, corn, wheat, grass, hemp, tobacco.

Principal live-stock, cattle, hogs.

Minerals, coal.

Minerals developed, coal.

Topography, rolling.

SHIPMENTS.

Cattle, hd	12,982	Veal, lbs	800
Hogs, hd	42,569	Game, lbs	60
Horses, hd	253	Lard, lbs	215
Sheep, hd	7,424	Poultry, lbs	122,536
Blood horses, hd	2	Eggs, doz	103,299
Blood cattle, hd	1	Butter, lbs	16,637
Blood hogs, hd	13	Feathers, lbs	730
Mixed stock, cars	43	Wine, galls	800
Wheat, bus	37,732	Seeds, bus	3,469
Corn, bus	4,008	Clover seed, bus	35
Rye, bus	95	Mushrooms, lbs	125
Hay, tons	20	Milk, galls	600
Straw, tons	30	Lumber, cars	68
Potatoes, brls	3,056	Logs, cars	92
Wool, lbs	27,793	Wood, cars	87
Hides, lbs	42,326	Stone, cars	172
Flour, lbs	843,445	Sand, cars	22
Shipstuff, lbs	21,452	Ties, cars	34
Beans, crates	667	Sawdust, car	1
Peaches, crates	10	Brick, cars	7
Berries, crates	121	Coal, cars	157
Plums, crates	200	Charcoal, cars	4
Melons, cars	6	Other cars	176
Fruit, cars	6	Miscellaneous, lbs	1,100,200
Tallow, lbs	1,215		
Pork, lbs	755		

CLINTON.

Land, per cent in cultivation and pasture	92
of remainder that could be profitably enclosed	90
enclosed and cultivated has increased in last 10 years	16
in commercial timber	3

Principal agricultural productions, corn and grass.

Principal live-stock, cattle and hogs.

Topography, undulating.

SHIPMENTS.

Cattle, hd	11,544	Shipstuff, lbs	343,175
Hogs, hd	51,509	Hides, lbs	58,120
Horses, hd	2,097	Peaches, crates	80
Sheep, hd	3,025	Dried fruit, lbs	170
Blood horses, hd	40	Furs, lbs	157
Blood cattle, hd	34	Veal, lbs	2,465
Blood sheep, hd	13	Game, lbs	200
Blood hogs, hd	37	Tallow, lbs	12,680
Provisions, lbs	3,872	Seed, bus	2,564
Wheat, bus	14,033	Poultry, lbs	242,485
Corn, bus	1,600	Eggs, doz	145,270
Oats, bus	8,262	Butter, lbs	19,191
Barley, bus	1,277	Nursery stock, lbs	5,000
Hay, tons	317	Lumber, cars	239
Tobacco, lbs	160	Tiling, cars	5
Wool, lbs	6,000	Coal, cars	2
Flour, lbs	14,712,246	Miscellaneous, lbs	1,029,383

COLE.

Land, per cent in cultivation and pasture	61
of remainder that could be profitably enclosed	62
enclosed and cultivated has increased in last 10 years	20
in commercial timber	25

Principal agricultural productions, corn, wheat, oats, hay, fruit.

Principal live-stock, hogs, cattle, horses.

Minerals, lead, iron, coal.

Minerals developed, lead and coal.

Topography, broken, undulating.

SHIPMENTS.

Cattle, hd	1,298	Potatoes, brls	50
Hogs, hd	11,524	Melons, car	1
Sheep, hd	1,600	Wool, lbs	3,680
Horses, hd	103	Hides, lbs	56,470
Mixed stock, cars	86	Beer, galls	95,697
Wheat, bus	259,878	Barytes, cars	11
Hay, tons	6	Brick, cars	22
Provisions, lbs	1,645	Junk, cars	11
Pork, lbs	290	Sand, cars	4
Flour, lbs	17,120,545	Wood, cars	79
Shipstuff, lbs	5,127,510	Hoops, cars	6
Clover seed, bus	766	Lumber, cars	24
Dried fruit, lbs	1,600	Ties, cars	8
Berries, crates	7	Coal, cars	2
Fruit, mixed, crates	7	Sawdust, cars	2
Poultry, lbs	49,665	Ice, cars	9
Eggs, doz	131,542	Clay, cars	2
Butter, lbs	44,246	Tiff, cars	23
Tallow, lbs	87,840	Miscellaneous, lbs	445,345
Feathers, lbs	630		

COOPER.

Land, per cent in cultivation and pasture	80
of remainder that could be profitably enclosed	40
enclosed and cultivated has increased in last 10 years	15
in commercial timber	12

Principal agricultural productions, corn, wheat, oats and grass.

Principal live-stock, cattle, hogs, horses, sheep.

Minerals, coal limited quantities, iron, zinc, lead.

Minerals developed, coal.

Topography, undulating.

SHIPMENTS.

Cattle, hd	7,403	Butter, lbs	34,428
Hogs, hd	33,206	Clover seed, bus	500
Horses, hd	580	Garden seed, lbs	710
Sheep, hd	3,600	Lumber, cars	225
Mixed stock, cars	57	Ties, cars	28
Provisions, lbs	59,640	Logs, cars	10
Wheat, bus	421,000	Wood, cars	175
Corn, bus	821	Hoops, cars	2
Oats, bus	4,000	Shingles, car	1
Flax, car	1	Brick, cars	57
Hay, tons	10	Stone, car	1
Tobacco, lbs	27,680	Marble, car	1
Potatoes, bbls	1,071	Coal, cars	76
Wool, lbs	45,933	Lime, cars	27
Hides, lbs	69,666	Pottery, cars	26
Furs, lbs	866	Tar, car	1
Flour, lbs	1,342,000	Ice, cars	19
Shipstuff, lbs	594,000	Junk, cars	6
Nursery stock, lbs	20,000	Clay, cars	2
Melons, cars	2	Sand, cars	358
Grapes, crates	46	Barrels, cars	5
Dried fruit, lbs	2,260	Leather, lbs	22,300
Tallow, lbs	22,676	Oil, galls	31,260
Poultry, lbs	79,934	Other cars	53
Eggs, doz	160,244	Miscellaneous, lbs	247,656

CRAWFORD.

Land, per cent in cultivation and pasture	33
of remainder that could be profitably enclosed	45
enclosed and cultivated has increased in last 10 years	10
in commercial timber	30

Principal agricultural products, corn, wheat, oats, grass, fruit.

Principal live-stock, horses, cattle, hogs, sheep.

Minerals, iron, lead, copper, zinc, coal, onyx.

Minerals developed, lead and iron.

Topography, undulating to broken.

SHIPMENTS.

Cattle, hd	2,139	Pork, lbs	737
Hogs, hd	6,062	Game, lbs	12 616
Horses, hd	64	Lard, lbs	510
Sheep, hd	2,346	Tallow, lbs	7,040
Mixed live-stock, cars	11	Poultry, lbs	285,713
Wheat, bus	104,078	Eggs, doz	411,391
Oats, bus	500	Butter, lbs	1,814
Hay, tons	40	Feathers, lbs	3,595
Potatoes, brls	376	Timothy seed, bus	50
Wool, lbs	24,911	Clover seed	5,650
Pelts, lbs	7,215	Lumber, cars	15
Hides, lbs	66,851	Ties, cars	4,010
Nuts, bus	204	Wood, cars	3,045
Flour, lbs	787,580	Hoops, cars	32
Shipstuff, lbs	10,665	Iron ore, cars	2
Corn-meal, lbs	600	Iron, cars	678
Beans, crates	26	Lead ore, cars	25
Onions, bus	120	Junk, cars	25
Apples, brls	31	Clay, cars	21
Dried fruit, lbs	16,498	Charcoal, cars	10
Wine, galls	75		

DADE.

Land, per cent in cultivation and pasture	75
of remainder that could be profitably enclosed	72
enclosed and cultivated has increased in last 10 years	58
in commercial timber	5

Principal agricultural productions, corn, wheat, oats, grass.

Principal live-stock, cattle, hogs, sheep, horses.

Minerals, lead, zinc, coal.

Minerals developed, lead, zinc, coal.

Topography, eastern part broken, western undulating.

SHIPMENTS.

Cattle, hd	3,021	Game, lbs	40,675
Hogs, hd	16,334	Eggs, doz	96,110
Horses, hd	62	Poultry, lbs	99,165
Wheat, bus	138,709	Butter, lbs	24,205
Corn, bus	1,414	Farm produce, lbs	44,000
Oats, bus	28,443	Feathers, lbs	1,000
Flax, cars	23	Lumber, cars	10
Hay, tons	1,300	Wood, cars	34
Flour, lbs	9,813,252	Zinc, cars	6
Wool, lbs	1,000	Stone, cars	63
Pelts, lbs	1,198	Lime, cars	475
Furs, lbs	1,387	Coal, cars	5
Hides, lbs	3,020	Junk, cars	5
Nursery stock, lbs	200	Brick, cars	5
Grapes, crates	210	Other cars	16
Beef, lbs	2,000	Miscellaneous, lbs	775,375

DAVIESS.

Land, per cent in cultivation and pasture	90
of remainder that could be profitably enclosed	50
enclosed and cultivated has increased in last 10 years	20
that is swamp or wet	5
of swamp that can be reclaimed by drainage	100
in commercial timber	10

Principal agricultural productions, corn, grass, oats.

Principal live-stock, cattle, hogs, horses.

Topography, undulating.

SHIPMENTS.

Cattle, hd	5,369	Beans, lbs	920
Hogs, hd	31,414	Molasses, galls	1,430
Horses, hd	367	Beef, lbs	500
Sheep, hd	5,488	Lard and tallow, lbs	13,380
Wheat, bus	2,400	Poultry, lbs	319,375
Oats, bus	2,051	Eggs, doz	110,696
Hay, tons	60	Butter, lbs	62,933
Potatoes, brls	49	Cheese, lbs	20,035
Wool, lbs	17,010	Cream, lbs	7,100
Pelts, lbs	1,010	Feathers, lbs	1,279
Hides, lbs	10,080	Game, lbs	277
Furs, lbs	55	Timothy seed, bus	275
Nuts, bus	337	Hungarian seed, bus	130
Flour, lbs	233,116	Lumber, cars	270
Shipstuff, lbs	9,060	Brick and stone, cars	52
Nursery stock, lbs	18,585	Ice, cars	18
Pop-corn, lbs	28,000	Miscellaneous, lbs	103,610
Melons, car	1	Mixed grain, cars	2
Dried fruit, lbs	245	Other cars	8
Castor beans, lbs	16,770		

DeKALB.

Land, per cent in cultivation and pasture	100
enclosed and cultivated has increased in last 10 years	27
of swamp that could be reclaimed by drainage	100

Principal agricultural productions, corn, oats, wheat, grass.

Principal live-stock, cattle, hogs, horses.

Topography, rolling.

SHIPMENTS.

Cattle, hd	5,919	Nursery stock, lbs	102,050
Hogs, hd	24,355	Honey, lbs	350
Horses, hd	300	Onions, bus	55
Mixed stock, cars	26	Molasses, galls	1,181
Sheep, hd	1,650	Fruit, crates	53
Blood horses, hd	3	Pork, lbs	935
Blood cattle, hd	1	Veal, lbs	4,948
Blood hogs, hd	25	Game, lbs	250
Wheat, bus	1,600	Tallow, lbs	430
Corn, bus	90,571	Poultry, lbs	83,630
Oats, bus	19,184	Eggs, doz	105,600
Rye, bus	2,585	Butter, lbs	95,966
Mixed grain, car	1	Cheese, lbs	145
Broom-corn, bales	30	Feathers, lbs	387
Hay, tons	95	Seed, bus	1,950
Potatoes, brls	14	Lumber, car	1
Wool, lbs	5,617	Logs, cars	5
Hides, lbs	20,855	Wood, cars	10
Provisions, lbs	700	Miscellaneous, lbs.	929,370
Flour, lbs	1,493,280		

DENT.

Land, per cent in cultivation and pasture	20
of remainder that could be profitably enclosed	38
enclosed and cultivated that has increased in last 10 years	17
that is swamp or wet	5
of swamp that can be reclaimed by drainage	95
in commercial timber	35

Principal agricultural productions, corn, wheat, oats, clover.

Principal live-stock, cattle, hogs, sheep, horses.

Minerals, iron.

Topography, undulating to broken.

SHIPMENTS.

Cattle, hd	4,945	Game, lbs	58,910
Hogs, hd	12,043	Tallow, lbs	3,360
Horses, hd	12	Poultry, lbs	203,965
Sheep, hd	2,593	Eggs, doz	217,060
Wheat, bus	60,300	Butter, lbs	1,625
Corn, bus	500	Feathers, lbs	5,460
Hay, tons	20	Clover seed, bus	3,490
Wool, lbs	56,760	Lumber, cars	128
Pelts, lbs	390	Ties, cars	203
Hides, lbs	52,362	Wood, cars	2
Furs, lbs	70	Brick, car	1
Flour, lbs	5,900	Pig iron, cars	214
Shipstuff, lbs	70,200	Iron ore, cars	12
Beeswax, lbs	585	Junk, cars	2
Dried fruit, lbs	8,020	Charcoal, cars	29

DUNKLIN.

Land, per cent in cultivation and pasture	25
of remainder that could be profitably enclosed	65
enclosed and cultivated has increased in last 10 years	100
that is swamp or wet	50
of swamp that could be reclaimed by drainage	65
in commercial timber	15

Principal agricultural productions, cotton, corn, wheat, grasses.

Principal live-stock, hogs, horses.

Topography, generally level.

SHIPMENTS.

Cattle, hd	924	Cotton-seed, bus	75,200
Hogs, hd	3,200	Strawberries, crates	25
Mixed stock, cars	110	Fish, lbs	201,985
Provisions, lbs	5,000	Frogs, lbs	20,295
Wheat, bus	800	Poultry, lbs	11,745
Corn, bus	38,401	Eggs, doz	29,880
Oats, bus	21	Lumber, cars	1,381
Mixed grain, cars	101	Piling, cars	15
Hay, tons	177	Ties, cars	8
Vegetables, lbs	6,067,249	Logs, cars	2
Hides, lbs	370	Stave bolts, cars	92
Furs, lbs	560	Spokes, cars	12
Flour, lbs	1,900	Staves, cars	95
Nursery stock, lbs	2,000	Posts, car	1
Cotton, bales	7,003	Other cars	5
Cotton-seed products, lbs	3,079,290	Miscellaneous, lbs	828,795

FRANKLIN.

Land, per cent in cultivation	33
of remainder that could be profitably enclosed	55
enclosed and cultivated has increased in last 10 years	17
that is swamp or wet	6
of swamp land that could be reclaimed by drainage	28
in commercial timber	8

Principal agricultural productions, wheat, oats, corn.

Principal live-stock, horses, mules, hogs.

Minerals, lead, iron, tripoli.

Minerals developed, lead, iron, tripoli.

Topography, broken.

SHIPMENTS.

Cattle, hd	3,567	Butter, lbs	27,864
Hogs, hd	18,464	Feathers, lbs	586
Horses and mules, hd	116	Clover seed, bus	8,962
Sheep, hd	1,939	Garden seed, lbs	70
Mixed stock, hd	1,165	Vinegar, galls	50
Wheat, bus	1,061,725	Soda pop, galls	11,166
Corn, bus	24,027	Beer, galls	33,288
Oats, bus	47	Cob pipes, lbs	294,030
Hay, tons	50	Stoneware, lbs	8,491
Potatoes, bris	207	Lumber, cars	42
Wool, lbs	38,722	Ties, cars	338
Pelts, lbs	2,419	Wood, cars	861
Hides, lbs	139,461	Staves, cars	32
Furs, lbs	245	Hoops, cars	23
Nuts, bus	122	Logs, cars	31
Flour, lbs	21,533,970	Cobs, cars	26
Shipstuff, lbs	1,580,195	Brick, cars	19
Corn-meal, lbs	4,747	Stone, cars	3
Nursery stock, lbs	57,375	Pig lead, cars	2
Onions, bus	217	Slag, car	1
Molasses, galls	250	Clay, cars	55
Grapes, crates	6,500	Tiff, cars	12
Dried fruit, lbs	13,994	Iron ore, cars	3
Wine, galls	12,399	Junk, cars	9
Pork, lbs	101,554	Sand, cars	1,485
Game, lbs	7,508	Tripoli, cars	2
Lard, lbs	7,770	Sloes, lbs	29,910
Tallow, lbs	39,360	Other cars	10
Poultry, lbs	288,702	Miscellaneous, lbs	211,388
Eggs, doz	605,753		

GASCONADE.

Land, per cent in cultivation and pasture	50
of remainder that could be profitably enclosed	50
in commercial timber	25

Principal agricultural productions, wheat, corn, clover.

Principal live-stock, cattle, hogs, horses.

Minerals, iron, kaolin.

Topography, generally broken.

SHIPMENTS.

Cattle, hd	538	Potatoes, brls	165
Hogs, hd	6,565	Onions, brls	32
Sheep, hd	480	Wine, galls	26,534
Provisions, lbs	50,657	Nursery stock, lbs	7,195
Wheat, bus	3,435,408	Beer, galls	45,800
Corn, bus	18,477	Dressed meat, lbs	45,150
Flour, lbs	4,783,750	Hides, lbs	102,099
Shipstuff, lbs	140,000	Tallow, lbs	21,174
Clover seed, bus	2,487	Poultry, lbs	44,030
Cobs, car	1	Eggs, doz	111,270
Wool, lbs	21,728	Brick, cars	2
Apples, brls	126	Hoops, cars	9
Grapes, lbs	2,260	Lumber, cars	11
Dried fruit, lbs	10,257	Ice, car	1
Vegetables, lbs	37,583	Other cars	30

GENTRY.

Land, per cent in cultivation and pasture	96
of remainder that could be profitably enclosed	100
enclosed and cultivated has increased in last 10 years	26
in commercial timber	5

Principal agricultural productions, corn, wheat, rye, oats, grass.

Principal live-stock, cattle, horses, hogs, sheep.

Topography, some level bottom, rolling upland.

SHIPMENTS.

Cattle, hd	10,758	Apples, brls	113
Hogs, hd	30,400	Dried fruit, lbs	50
Horses, hd	801	Game, lbs	695
Sheep, hd	1,600	Tallow, lbs	1,370
Blood horses, hd	2	Poultry, lbs	579,872
Blood hogs, hd	15	Eggs, doz	101,325
Mixed stock, cars	46	Butter, lbs	52,713
Fancy poultry, hd	14	Feathers, lbs	325
Wheat, bus	1,800	Timothy seed, bus	2,445
Corn, bus	120,010	Millet-seed, bus	1,024
Oats, bus	14,400	Lumber, cars	11
Rye, bus	200	Piling, cars	15
Hay, tons	100	Logs, cars	2
Mixed grain, cars	2	Wood, cars	495
Wool, lbs	8,355	Saw-dust, cars	11
Furs, lbs	226	Posts, cars	27
Hides, lbs	14,631	Brick, cars	29
Nuts, bus	254	Stone, car	1
Flour, lbs	526,380	Tile, cars	59
Nursery stock, lbs	850	Junk, cars	7
Cabbage, car	1	Sand, cars	109
Onions, bus	110	Other cars	5
Molasses, galls	500	Miscellaneous, lbs	134,486
Strawberries, crates	6		

GREENE.

Land, per cent in cultivation and pasture	85
of remainder that could be profitably enclosed	75
enclosed and cultivated has increased in last 10 years	20
in commercial timber	5

Principal agricultural productions, clover, corn, wheat.

Principal live-stock, cattle, hogs, horses.

Minerals, zinc, lead.

Mineral developed, lead zinc.

Topography, rolling to broken.

SHIPMENTS.

Cattle, hd	6,572	Fish, lbs	2,592
Hogs, hd	27,175	Poultry, lbs	256,249
Horses, hd	1,636	Eggs, doz	1,274,348
Sheep, hd	2,692	Butter, lbs	7,434
Mixed live-stock, cars	158	Feathers, lbs	3,127
Calves, lbs	2,186	Packing-house products, lbs	142,000
Wheat, bus	561,311	Cheese, lbs	7,250
Corn, bus	38,379	Lumber, cars	55
Oats, bus	28,440	Wood, cars	575
Hay, tons	796	Staves and shingles, cars	20
Potatoes, brls	430	Brick and stone, cars	114
Wool, lbs	6,493	Iron, cars	45
Hides, lbs	68,113	Lead, cars	112
Flour, lbs	59,976,000	Coal, cars	27
Shipstuff, lbs	4,451,000	Lime, cars	3,116
Corn-meal, lbs	30,000	Pottery, cars	12
Nursery stock, lbs	123,800	Ice, cars	165
Cotton, bales	108	Tar, cars	10
Cider, galls	600	Junk, cars	12
Strawberries, crates	1,144	Sand, etc., cars	114
Apples, brls	1,306	Miscellaneous, lbs	25,868,000
Vegetables, lbs	24,463	Farm products, lbs	3,412,000
Dried fruit, lbs	63,200	Other cars	116
Game, lbs	34,977		

GRUNDY.

Land, per cent in cultivation and pasture	96
of remainder that could be profitably enclosed	100
enclosed and cultivated has increased in last 10 years	27
that is swamp or wet	7
of swamp or wet that could be reclaimed by drainage	100
in commercial timber	5

Principal agricultural productions, corn, small grain and grass.

Principal live-stock, hogs and cattle.

Minerals, coal.

Mineral developed, coal.

Topography, undulating.

SHIPMENTS.

Cattle, hd	5,445	Apples, brls	146
Hogs, hd	19,342	Dried fruit, lbs	450
Horses, hd	601	Beef and pork, lbs	450
Sheep, hd	2,560	Veal, lbs	500
Blood horses, hd	14	Game, lbs	760
Blood cattle, hd	1	Lard, lbs	150
Mixed stock, cars	4	Tallow, lbs	10,670
Provisions, lbs	20,000	Poultry, lbs	110,878
Wheat, bus	680	Eggs, doz	259,430
Corn, bus	39	Butter, lbs	51,021
Oats, bus	1,600	Feathers, lbs	180
Hay, tons	20	Grass seed, bus	21
Millet, bus	1,030	Lumber, cars	28
Tobacco, lbs	1,630	Piling, cars	44
Wool, lbs	87,110	Ties, cars	46
Pelts, lbs	1,520	Logs, cars	15
Hides, lbs	45,967	Wood, cars	42
Nuts, bus	2,753	Hoops, cars	9
Flour, lbs	74,620	Stone, cars	22
Mill stuff, lbs	4,160	Coal, cars	19
Corn-meal, lbs	820	Brick, cars	3
Nursery stock, lbs	6,430	Lime, cars	9
Honey, lbs	60	Ice, car	1
Beeswax, lbs	560	Junk, cars	4
Onions, bus	7	Other cars	5
Molasses, galls	1,138	Miscellaneous, lbs	1,841,846
Melons, car	1		

HARRISON.

Land, per cent in cultivation and pasture	97
of remainder that could be profitably enclosed	75
enclosed and cultivated has increased in last 10 years	24
that is swamp or wet	2
of swamp that could be reclaimed by drainage	80
in commercial timber	2

Principal agricultural productions, corn, wheat, oats, grasses.

Principal live-stock, cattle, hogs, horses, sheep.

Topography, level to undulating.

SHIPMENTS.

Cattle, hd	16,390	Strawberries, crates	400
Hogs, hd	30,400	Apples, brls	430
Horses, hd	740	Butter, lbs	263,102
Sheep, hd	2,140	Eggs, doz	1,096,110
Blood hogs, hd	3	Poultry, lbs	390,296
Mixed stock, cars	8	Potatoes, brls	46
Provisions, lbs	117,052	Game, lbs	1,200
Wheat, bus	2,400	Feathers, lbs	715
Corn, bus	99,200	Beef, lbs	300
Oats, bus	24,800	Wine, galls	10
Hay, tons	180	Timothy seed, bus	1,600
Flour, lbs	31,400	Millet seed, bus	800
Shipstuff, lbs	54,134	Post, cars	2
Meal, lbs	10,575	Wood, cars	28
Broom-corn, bales	2	Junk, cars	3
Wool, lbs	494	Brick, cars	12
Hides, lbs	2,085	Lumber, cars	25
Pelts, lbs	1,050	Hoops, cars	22
Molasses, galls	10	Ax-handles, cars	3
Nursery stock, lbs	350	Other cars	5
Honey, lbs	500	Miscellaneous, lbs	316,773

HENRY.

Land, per cent in cultivation	87
of remainder that could be profitably enclosed	80
enclosed and cultivated has increased in last 10 years	22
that is swamp or wet	6
of swamp land that could be reclaimed by drainage	80
in commercial timber	9

Principal agricultural productions, corn, wheat, oats, flax.

Principal live-stock, horses, cattle, hogs.

Minerals, coal, iron, clay.

developed, coal, iron, clay.

Topography, undulating to level.

SHIPMENTS.

Cattle, hd	15,077	Dried fruit, lbs	123,980
Hogs, hd	42,505	Game, lbs	550
Horses, hd	787	Fish, lbs	520
Sheep, hd	4,456	Lard, lbs	17,500
Mixed stock, cars	139	Tallow, lbs	350
Blood hogs, hd	10	Poultry, lbs	1,351,035
Wheat, bus	197,600	Eggs, doz	747,036
Corn, bus	357,200	Butter, lbs	145,775
Oats, bus	15,303	Cheese, lbs	9,250
Flax, cars	47	Feathers, lbs	2,078
Hay, tons	7,436	Lumber, cars	113
Tobacco, lbs	30,940	Wood, cars	155
Potatoes, brls	478	Stone, cars	62
Broom-corn, bales	1,847	Brick, cars	119
Cobs, cars	2	Coal, cars	4,634
Mixed grain, cars	8	Pottery, cars	789
Hides, lbs	3,135	Junk, cars	40
Provisions, lbs	10,928	Clay, cars	459
Sorghum seed, bus	800	Sand, cars	45
Timothy, bus	96	Salt, cars	3
Flour, lbs	61,762,495	Iron ore, cars	16
Millstuff, lbs	2,431,195	Slag, cars	6
Meal, corn, lbs	3,300	Tiff, cars	2
Nursery stock, lbs	52,485	Ice, cars	2
Onions, bus	80	Other cars	70
Molasses, galls	10,916	Miscellaneous, lbs	15,377,545
Castor beans, lbs	72,000	Logs, cars	2
Plums, crates	100		
Strawberries, crates	50		

HOLT.

Land, per cent in cultivation and pasture	82
of remainder that could be profitably enclosed	90
enclosed and cultivated has increased in last 10 years	30
that is swamp or wet	7
of swamp that could be reclaimed by drainage	100
in commercial timber	3

Principal agricultural productions, corn, wheat, grass.

Principal live-stock, cattle.

Topography, level bottoms, rolling upland.

SHIPMENTS.

Cattle, hd	14,260	Grapes, crates	3,512
Hogs, hd	41,364	Plums, crates	4,020
Horses, hd	460	Veal, lbs	500
Sheep, hd	1,000	Game, lbs	2,390
Mixed stock, car	1	Fish, lbs	150
Blooded sheep, hd	2	Poultry, lbs	278,083
Blooded hogs, hd	13	Eggs, lbs	8,685
Wheat, bus	99,200	Butter, lbs	9,455
Corn, bus	446,404	Fruit, cars	22
Oats, bus	16,800	Wood, cars	36
Hay, tons	180	Coal, cars	3
Flour, lbs	2,600,050	Lumber, cars	27
Nursery stock, lbs	455	Stone, cars	5
Peaches, crates	424	Junk, car	1
Raspberries, crates	16	Other cars	15
Blackberries, crates	2,035	Miscellaneous, lbs	2,660,000

HOWARD.

Land, per cent in cultivation and pasture	95
of remainder that could be profitably enclosed	75
enclosed and cultivated has increased in last 10 years	5
in commercial timber	5

Principal agricultural productions, corn, wheat, oats, grass, tobacco, fruit.

Principal live-stock, cattle, hogs, mules and horses.

Minerals, coal.

Minerals developed, coal.

Topography, undulating.

SHIPMENTS.

Cattle, hd	4,338	Tallow, lbs	185
Hogs, hd	21,268	Poultry, lbs	63,675
Horses, hd	615	Eggs, doz	21,620
Sheep, hd	6,201	Butter, lbs	1,116
Mixed stock, cars	14	Clover seed, bus	476
Provisions, lbs	22,000	Blue-grass seed, bus	348
Wheat, bus	168,067	Lumber, cars	26
Corn, bus	8,000	Ties, cars	29
Molasses, galls	83	Logs, cars	17
Meat, lbs	1,250	Wood, cars	4
Tobacco, lbs	111,915	Macadam, cars	2
Potatoes, brls	1,895	Hoops, cars	7
Wool, lbs	15,518	Brick, cars	6
Hides, lbs	9,520	Junk, cars	3
Nuts, bus	1,576	Sand, cars	8
Flour, lbs	6,684,640	Other cars	3
Corn meal, lbs	2,625	Miscellaneous, lbs	2,422,594
Onions, bus	11		

HOWELL.

Land, per cent in cultivation and pasture	22
of remainder that could be profitably enclosed	75
in commercial timber	55

Principal agricultural productions, wheat, corn, oats, fruit.

Minerals, lead, zinc, iron, onyx.

Minerals developed, iron.

Topography, undulating to broken.

SHIPMENTS.

Cattle, hd	5,300	Lumber, cars	834
Hogs, hd	22,972	Piling, cars	227
Horses, hd	380	Iron ore, cars	116
Wheat, bus	43,199	Coal, cars	12
Corn, bus	1,286	Lime, cars	2
Hay, tons	670	Junk, cars	2
Flour, lbs	1,080,000	Sand, cars	11
Machinery, cars	8	Miscellaneous, cars	250
Cotton-seed, lbs	46,875	Farm products, tons	22

IRON.

Land, per cent in cultivation and pasture	33⅓
of remainder that could be profitably enclosed	80
enclosed and cultivated has increased in last 10 years	5
in commercial timber	54

Principal agricultural productions, wheat, corn, oats, grass, fruit.

Principal live-stock, hogs, cattle, mules.

Minerals, iron, lead, zinc, kaolin, granite.

Topographpy, rolling and broken.

SHIPMENTS.

Cattle, hd	1,782	Dried fruit, lbs	300
Hogs, hd	3,360	Mineral specimens, lbs	180
Horses, hd	20	Beans, lbs	1,800
Sheep, hd	1,120	Oil, lbs	58,000
Mixed live-stock, cars	25	Hoops, cars	28
Provisions, lbs	5,349	Junk, cars	5
Corn, bus	35	Iron ore, cars	20
Hay, tons	103	Hubs, cars	6
Flour, lbs	1,020,470	Lumber, cars	325
Hides, lbs	109,111	Piling, cars	82
Wool, lbs	2,047	Ties, cars	2
Feathers, lbs	700	Stone, cars	486
Poultry, lbs	23,758	Granite, cars	75
Eggs, doz	25,960	Paving-blocks, cars	149
Butter, lbs	18,630	Other cars	25
Apples, brls	6	Miscellaneous, lbs	330,397

JACKSON.

Land, per cent in cultivation and pasture	90
of remainder that could be profitably enclosed	70
enclosed and cultivated has increased in last 10 years	15
that is swamp or wet	5
of swamp that can be reclaimed by drainage	90
in commercial timber	5

Principal agricultural productions, corn, wheat, oats, rye and grass.

Principal live-stock, cattle and hogs.

Minerals, coal, in limited quantities.

Minerals developed, coal.

Topography, undulating, slightly broken.

SHIPMENTS.

(Exclusive of Kansas City.)

Cattle, hd	17,715	Apples, brls	77
Hogs, hd	30,849	Dried fruit, lbs	2,260
Horses, hd	680	Beef, lbs	2,566,700
Sheep, hd	6,683	Pork, lbs	1,283,300
Blood horses, hd	12	Veal, lbs	17,642
Blood cattle, hd	33	Fish, lbs	44,840
Mixed live-stock, cars	56	Lard, lbs	80,740
Wheat, bus	217,094	Tallow, lbs	22,760
Corn, bus	95,424	Grease, lbs	36,480
Oats, bus	45,242	Poultry, lbs	51,909
Rye, bus	4,288	Eggs, doz	9,904
Hay, tons	2,462	Butter, lbs	22,454
Vegetables, lbs	2,000	Cheese, lbs	29,480
Mixed grain, cars	60	Milk, galls	36,790
Potatoes, brls	1,117	Timothy seed, bus	14,322
Wool, lbs	12,400	Clover seed, bus	16,735
Hides, lbs	60,000	Millet seed, bus	48,900
Flour, lbs	22,139,120	Oil-cake, bus	260,000
Shipstuff, lbs	2,280,000	Lumber, cars	3,684
Corn-meal, lbs	2,220	Piling, cars	80
Nursery stock, lbs	140,000	Logs, cars	29
Honey, lbs	1,090	Wood, cars	128
Onions, bus	862	Staves, cars	3
Castor oil, brls	280	Posts, cars	7
Molasses, galls	18,148	Shingles, cars	39
Tomatoes, lbs	28,680	Brick, cars	268
Cucumbers, lbs	3,720	Tiling, cars	58
String beans, crates	76	Coal, cars	1,554
Melons, cars	2	Lime, cars	13
Peaches, crates	154	Pottery, cars	8
Raspberries, crates	2,236	Ice, cars	16
Blackberries, crates	184	Clay, cars	168
Cherries, crates	140	Sand, car	1
Grapes, crates	1,760	Charcoal, cars	7
Gooseberries, crates	82	Miscellaneous, cars	3,010

JASPER.

Land, per cent in cultivation and pasture	80
of remainder that could be profitably enclosed	95
enclosed and cultivated has increased in last 10 years	100
in commercial timber	10

Principal agricultural productions, wheat, corn, grass, oats.

Principal live-stock, cattle, hogs, horses.

Minerals, lead and zinc.

Minerals developed, lead and zinc.

Topography, rolling to broken.

SHIPMENTS.

Cattle, hd	3,861	Game, lbs	4,674
Hogs, hd	15,315	Tallow, lbs	20,500
Horses, hd	935	Poultry, lbs	91,944
Sheep, hd	400	Eggs, doz	52,740
Mixed live-stock, cars	28	Butter, lbs	19,100
Provisions, lbs	593,370	Milk, galls	4,015
Wheat, bus	466,629	Feathers, lbs	1,556
Corn, bus	1,400	Brick, cars	99
Oats, bus	2,800	Zinc ore, cars	3,989
Flax, cars	15	Lead ore, cars	325
Hay, tons	2,361	Pig lead, cars	381
Mixed grain, cars	33	Junk, cars	59
Wool, lbs	1,200	Lime, cars	777
Pelts, lbs	300	Lumber, cars	180
Hides, lbs	923,526	Ties, cars	156
Furs, lbs	170	Ballast, cars	276
Flour, lbs	39,067,000	Sand, cars	212
Shipstuff, lbs	5,087,000	Spelter, cars	26
Meal, lbs	80,000	Paint, cars	6
Nursery stock, lbs	205,000	Piling, cars	683
Vegetables, lbs	45,000	Coal, cars	385
Tomatoes, crates	2,500	Farm products, lbs	44,000
Sweet corn, crates	1,000	Iron, cars	4
Strawberries, crates	3,700	Wood, cars	112
Gooseberries, crates	3	Tiling, cars	2
Melons, cars	4	Stone, cars	559
Apples, brls	772	Pottery, cars	12
Dried fruit, lbs	25,050	Tar, cars	4
Canned goods, lbs	455,000	Ice, cars	70
Beer, galls	11,250	Miscellaneous, cars	390
Pork, lbs	205		

JEFFERSON.

Land, per cent in cultivation and pasture	50
of remainder that could be profitably enclosed	60
in commercial timber	40

Principal agricultural productions, corn, wheat, oats.

Large dairy interest.

Principal live-stock: horses and mules, 238,000, cattle, 120,000.

Minerals, lead, zinc, tiff, kaoline, potters' clay.

Minerals developed, lead, zinc, kaolin.

Topography, undulating to broken.

SHIPMENTS.

Cattle, hd	667	Fish, lbs	25,315
Hogs, hd	3,020	Poultry, lbs	24,737
Horses and mules, hd	16	Eggs, doz	9,385
Sheep, hd	362	Butter, lbs	1,068
Mixed stock, cars	5	Milk, galls	99,932
Calves, hd	384	Stone, cars	47
Wheat, bus	66,994	Lime, cars	604
Corn, bus	2,452	Junk, cars	8
Hay, tons	91	Gravel, cars	418
Flour, lbs	2,688,715	Lumber, cars	4
Shipstuff, lbs	460,000	Hoops, cars	26
Potatoes, brls	2,197	Clay, cars	11
Tobacco, lbs	450	Wood, cars	117
Wool, lbs	7,990	Machinery, cars	2
Hides, lbs	73,693	Door screens, cars	100
Pelts, lbs	3,000	White sand, cars	436
Cherries and peaches, crates	91	Cement, cars	93
Grapes, baskets	800	Pig lead, cars	812
Nursery stock, lbs	1,026,195	Lead ore, cars	6
Wine, galls	7,152	Brick, cars	5
Pork, lbs	3,825	Miscellaneous, cars	9
Tallow, lbs	4,000		

JOHNSON.

Land, per cent in cultivation and pasture	75
of remainder that could be profitably enclosed	60
enclosed and cultivated has increased in last 10 years	11
that is swamp or wet	2
of swamp or wet that could be reclaimed by drainage	75
in commercial timber	9

Principal agricultural productions, corn, wheat, oats, grass.

Principal live-stock, horses, cattle, hogs, sheep.

Minerals, coal.

Minerals developed, coal.

Topography, undulating.

SHIPMENTS.

Cattle, hd	8,337	Eggs, doz	116,694
Hogs, hd	26,516	Butter, lbs	20,036
Horses, hd	471	Apples, brls	36
Sheep, hd	1,477	Furs, lbs	3,125
Mixed stock, cars	77	Honey, lbs	240
Provisions, lbs	28,080	Clover-seed, bus	334
Wheat, bus	287,800	Packing-house products	41,300
Corn, bus	41,600	Clay, cars	291
Oats, bus	250	Coal, cars	531
Flax, cars	12	Brick, cars	16
Hay, tons	917	Tiling, cars	9
Flour, lbs	1,207,890	Junk, cars	4
Shipstuff, lbs	420,000	Stone, cars	515
Wool, lbs	27,755	Walnut lumber, cars	2
Hides, lbs	52,054	Logs, cars	8
Nursery stock, lbs	42,580	Other cars	8
Tallow, lbs	3,055	Miscellaneous, lbs	304,198
Poultry, lbs	203,193		

KNOX.

Land, per cent in cultivation and pasture	92
of remainder that could be profitably enclosed	100
enclosed and cultivated has increased in last 10 years	16
that is swamp or wet	5
of swamp or wet that could be reclaimed by drainage	95
in commercial timber	5

Principal agricultural productions, corn, grass, wheat, oats.

Principal live-stock, cattle, hogs.

Topography, undulating.

SHIPMENTS.

Cattle, hd	7,465	Hides, lbs	40,000
Hogs, hd	24,964	Game, lbs	175
Horses, hd	404	Veal, lbs	1,697
Sheep, hd	3,700	Poultry, lbs	223,340
Mixed stock, car	1	Eggs, doz	427,331
Provisions, lbs	21,920	Butter, lbs	71,421
Wheat, bus	2,657	Timothy seed, bus	21,489
Corn, bus	1,795	Hungarian seed, bus	800
Oats, bus	43,323	Hoops, cars	16
Mixed grain, car	1	Ties, cars	58
Hay, tons	2,155	Lumber, cars	42
Vegetables, lbs	150,000	Logs, cars	3
Flour, lbs	115,180	Brick, car	1
Shipstuff, lbs	48,000	Junk, car	1
Wool, lbs	3,135	Other cars	13
Furs, lbs	20	Miscellaneous, lbs	595,921

LACLEDE.

Land, per cent in cultivation and pasture	45
of remainder that could be profitably enclosed	38
enclosed and cultivated increased in last 10 years	40
that is swamp or wet	7
of swamp that can be reclaimed by drainage	70
in commercial timber	18

Principal agricultural productions, corn, wheat, grass, fruit.

Principal live-stock, cattle, hogs, sheep.

Minerals, iron and lead.

Topography, broken.

SHIPMENTS.

Cattle, hd	3,359	Dried fruit, lbs	30,420
Hogs, hd	9,174	Game, lbs	89,267
Horses, hd	395	Tallow, lbs	50,700
Sheep, hd	1,625	Poultry, lbs	214,162
Mixed stock, cars	72	Eggs, doz	250,215
Wheat, bus	451,983	Butter, lbs	4,960
Hay, tons	10	Feathers, lbs	4,169
Tobacco, lbs	500	Lumber, cars	22
Potatoes, brls	274	Ties, cars	75
Wool, lbs	42,511	Logs, cars	11
Pelts, lbs	5,000	Wood, cars	10
Hides, lbs	34,980	Saw-dust, cars	3
Flour, lbs	279,306	Shingles, cars	5
Shipstuff, lbs	40,000	Brick, cars	5
Beeswax, lbs	500	Junk, cars	5

LAFAYETTE.

Land, per cent in cultivation and pasture	90
of remainder that could be profitably enclosed	75
enclosed and cultivated has increased in last 10 years	20
that is swamp or wet	5
of swamp or wet that can be reclaimed by drainage	100
in commercial timber	5

Principal agricultural productions, corn, wheat, oats, grass, hemp.

Principal live-stock, cattle, hogs, horses.

Minerals, coal.

Minerals developed, coal.

Topography, undulating to level.

SHIPMENTS.

Cattle, hd	12,021	Pork, lbs	870
Hogs, hd	44,787	Fish, lbs	2,690
Horses, hd	1,216	Lard, lbs	50
Sheep, hd	2,913	Tallow, lbs	1,000
Mixed stock, cars	34	Poultry, lbs	53,630
Provisions, lbs	56,750	Eggs, doz	300,784
Wheat, bus	443,739	Butter, lbs	63,083
Corn, bus	19,484	Furs, lbs	75
Mixed grain, cars	3	Clover seed, bus	1,916
Hay, tons	50	Lumber, cars	92
Barley, bus	6,008	Corn-cobs, car	1
Rye, bus	800	Canned goods, cars	20
Molasses, galls	150	Ties, cars	3
Brooms, lbs	378	Logs, cars	3
Potatoes, brls	577	Wood, cars	144
Wool, lbs	8,502	Sawdust, car	1
Pelts, lbs	500	Brick, cars	117
Hides, lbs	59,465	Coal, cars	20,352
Flour, lbs	38,800,600	Tar, cars	4
Shipstuff, lbs	6,958,856	Junk, cars	12
Honey, lbs	2,280	Sand, car	1
Onions, bus	810	Coke, cars	9
Tomatoes, lbs	800	Stone, car	1
Vegetables, lbs	240,000	Rags, lbs	300
Peaches, crates	10	Hemp, lbs	1,000
Raspberries, crates	11	Miscellaneous, lbs	5,842,792
Apples, brls	208	Other cars	44
Dried fruit, lbs	4,073		

LAWRENCE.

Land, per cent in cultivation and pasture	78
of remainder that could be profitably enclosed	40
enclosed and cultivated has increased in last 10 years	40
in commercial timber	15

Principal agricultural productions, wheat, corn, oats, grass.

Principal live-stock, cattle, hogs, mules.

Minerals, zinc, lead, silica.

Minerals developed, zinc, lead, silica.

Topography, rolling to broken.

SHIPMENTS.

Cattle, hd	2,471	Hay, tons	110
Hogs, hd	11,435	Tallow, lbs	12,255
Horses, hd	22	Poultry, lbs	216,640
Sheep, hd	1,345	Butter, lbs	3,392
Blood horses, hd	4	Feathers, lbs	808
Mixed stock, cars	27	Eggs, doz	192,141
Wheat, bus	184,760	Canned goods, cases	7,899
Tobacco, lbs	510	Strawberries, crates	153
Potatoes, brls	511	Lumber, cars	2
Wool, lbs	3,575	Wood, car	1
Pelts, lbs	560	Brick, cars	20
Hides, lbs	211,671	Lead ore, cars	223
Nuts, bus	300	Zinc, cars	974
Flour, lbs	22,824,127	Lime, cars	24
Shipstuff, lbs	3,030,420	Ice, car	1
Dried fruit, lbs	200	Sand, cars	96
Game, lbs	49,128	Junk, cars	2

LEWIS.

Land, per cent in cultivation and pasture	92
of remainder that could be profitably enclosed	91
enclosed and cultivated has increased in last 10 years	14
that is swamp or wet	2
of swamp that could be reclaimed by drainage	100
in commercial timber	9

Principal agricultural production, corn, wheat, oats, grass.

Principal live-stock, hogs, cattle, horses, sheep.

Topography, undulating prairie, rolling timber land.

SHIPMENTS.

Cattle, hd	6,776	Veal, lbs	3,012
Hogs, hd	29,290	Game, lbs	2,000
Horses, hd	540	Fish, lbs	27,000
Sheep, hd	6,100	Packing-house products, lbs	29,520
Mixed stock, cars	5	Poultry, lbs	296,997
Provisions, lbs	21,785	Eggs, doz	90,755
Wheat, bus	91,200	Butter, lbs	182,610
Corn, bus	12,000	Feathers, lbs	100
Oats, bus	69,600	Garden seed, lbs	150
Hay, tons	4,630	Timothy, bus	7,307
Tobacco, lbs	19,120	Lumber, cars	465
Wool, lbs	60,815	Ties, cars	218
Hides, lbs	11,325	Wood, cars	189
Furs, lbs	415	Hoops, cars	30
Flour, lbs	4,440,000	Posts, cars	4
Shipstuff, lbs	288,000	Stone, cars	4
Beans, crates	75	Ice, cars	120
Berries, crates	740	Junk, cars	3
Cherries, crates	3	Other cars	29
Grapes, crates	10	Miscellaneous, lbs	314,947

LINCOLN.

Land, per cent in cultivation and pasture	80
of remainder that could be profitably enclosed	75
enclosed and cultivated has increased in last 10 years	16
that is swamp or wet	2
of swamp that could be reclaimed by drainage	50
in commercial timber	15

Principal agricultural productions, corn, wheat, grass.

Principal live-stock, cattle, hogs, horses.

Minerals, coal.

Mineral developed, coal.

Topography, western half undulating prairie, eastern broken.

SHIPMENTS.

Cattle, hd	2,013	Pork, lbs	540
Hogs, hd	18,091	Veal, lbs	300
Horses, hd	805	Game, lbs	3,132
Sheep, hd	2,312	Fish, lbs	54,458
Blood cattle, hd	4	Lard, lbs	190
Blood hogs, hd	29	Tallow, lbs	100
Mixed stock, cars	135	Poultry, lbs	387,993
Provisions, lbs	84,320	Eggs, doz	149,286
Wheat, bus	310,341	Butter, lbs	5,825
Corn, bus	555	Feathers, lbs	1,497
Oats, bus	30,576	Seed, lbs	1,200
Mixed grain, car	1	Lumber, cars	3
Hay, tons	630	Ties, cars	55
Wool, lbs	18,435	Wood, cars	45
Pelts, lbs	1,278	Hoops, cars	12
Hides, lbs	6,507	Stone, car	1
Flour, lbs	167,000	Lime, cars	142
Honey, lbs	550	Junk, cars	6
Beeswax, lbs	40	Other cars	9
Peaches, crates	90	Miscellaneous, lbs	6,969,564

LINN.

Land, per cent in cultivation and pasture	95
of remainder that could be profitably enclosed	97
enclosed and cultivated has increased in last 10 years	26
that is swamp or wet	5
of swamp that could be reclaimed by drainage	90
in commercial timber	5

Principal agricultural productions, corn, wheat, oats, grass, tobacco.

Principal live-stock, hogs, cattle, horses.

Minerals, coal.

Minerals developed, coal.

Topography, undulating.

SHIPMENTS.

Cattle, hd	12,655	Raspberries, crates	62
Hogs, hd	23,543	Blackberries, crates	12
Horses, hd	2,525	Grapes, bas	50
Sheep, hd	3,950	Apples, brls	14
Blood sheep, hd	2	Dried fruit, lbs	120
Blood hogs, hd	14	Game, lbs	222
Mixed stock, cars	4	Farm products, lbs	52,000
Wheat, bus	14,333	Poultry, lbs	452,048
Corn, bus	15,029	Eggs, doz	64,720
Oats, bus	18,850	Butter, lbs	12,749
Mixed grain, car	1	Feathers, lbs	1,109
Hay, tons	278	Timothy seed, bus	260
Flour, lbs	1,294,000	Fruit, car	1
Shipstuff, lbs	144,000	Lumber, cars	52
Hides, lbs	3,123	Wood, cars	9
Nuts, bus	885	Brick, cars	4
Nursery stock, lbs	935	Coal, cars	359
Peas, crates	10	Junk, cars	6
Cucumbers, crates	5	Sand, cars	2
Tomatoes, crates	18	Other cars	9
Beans, crates	21	Miscellaneous, lbs	19,667
Peaches, crates	62		

LIVINGSTON.

Land, per cent in cultivation and pasture	97
of remainder that could be profitably enclosed	100
enclosed and cultivated has increased in last 10 years	25
that is swamp or wet	20
of swamp that could be reclaimed by drainage	75
in commercial timber	20

Principal agricultural productions, corn, wheat, oats, grass, fruit.

Principal live-stock, cattle, hogs.

Minerals, coal.

Minerals developed, coal.

Topography, rolling.

SHIPMENTS.

Cattle, hd	6,242	Pork, lbs	1,500
Hogs, hd	18,116	Veal, lbs	705
Horses, hd	849	Game, lbs	4,964
Sheep, hd	1,692	Fish, lbs	3,055
Blood hogs, hd	17	Tallow, lbs	745
Mixed stock, cars	5	Poultry, lbs	187,207
Wheat, bus	4,510	Eggs, doz	384,797
Corn, bus	43,597	Butter, lbs	61,971
Oats, bus	22,434	Cream, gals	160
Rye, bus	400	Milk, galls	4,800
Hay, tons	460	Feathers, lbs	500
Potatoes, brls	17	Timothy seed, bus	418
Wool, lbs	28,000	Millet, bus	100
Pelts, lbs	20	Clover, bus	2
Hides, lbs	23,656	Lumber, cars	5
Furs, lbs	8,729	Wood, cars	32
Nuts, bus	1,395	Hoops, cars	7
Flour, lbs	1,711,420	Saw-dust, cars	2
Shipstuff, lbs	137,310	Posts, car	1
Nursery stock, lbs	2,186	Shingles, car	1
Honey, lbs	140	Brick, car	1
Molasses, galls	550	Iron, car	1
Pop-corn, bus	15	Coal, cars	4,106
Cucumbers, crates	335	Ice, car	1
Tomatoes, crates	856	Junk, cars	5
Peaches, crates	35	Sand, cars	4
Apples, brls	224	Stone, cars	280
Fruit, cars	10	Miscellaneous, lbs	320,000
Beef, lbs	225		

McDONALD.

Land, per cent in cultivation and pasture	25
of remainder that could be profitably enclosed	60
enclosed and cultivated has increased in last 10 years	30
in commercial timber	40

Principal agricultural productions, corn, wheat, clover, timothy.

Principal live-stock, horses, cattle, hogs, sheep.

Topography, rolling, broken.

SHIPMENTS.

Cattle, hd	242	Lumber, cars	95
Hogs, hd	3,040	Ties, cars	516
Horses, hd	60	Wood, cars	55
Mixed grain, cars	128	Brick, car	1
Flour, lbs	120,000	Miscellaneous, cars	70

This county having but few railroad stations, it is probable that other counties have received credit for a part of its productions.

MACON.

Land, per cent in cultivation and pasture	87
of remainder that could be profitably enclosed	75
enclosed and cultivated has increased in last 10 years	35
that is swamp or wet	2
of swamp that could be reclaimed by drainage	95
in commercial timber	10

Principal agricultural productions, oats, corn, grass, fruit.

Principal live stock, cattle, hogs, sheep.

Minerals, coal.

Minerals developed, coal.

Topography, level prairie, undulating timber land.

SHIPMENTS.

Cattle, hd	8,517	Nursery stock, lbs	400
Hogs, hd	22,503	Beans, crates	6,420
Horses, hd	1,086	Berries, crates	29
Sheep, hd	4,592	Veal, lbs	2,145
Blood sheep, hd	5	Game, lbs	2,000
Blood hogs, hd	16	Tallow, lbs	2,030
Provisions, lbs	9,407	Poultry, lbs	1,537,464
Wheat, bus	18,667	Eggs, doz	113,996
Corn, bus	4,556	Butter, lbs	57,702
Oats, bus	8,000	Feathers, lbs	6,950
Barley, bus	766	Lumber, cars	170
Hay, tons	952	Ties, cars	31
Tobacco, lbs	80,200	Logs, cars	6
Potatoes, brls	222	Hoops, cars	20
Vegetables, lbs	94,000	Brick, cars	10
Wool, lbs	41,786	Junk, cars	9
Pelts, lbs	370	Coal, cars	19,685
Hides, lbs	112,905	Other cars	7
Flour, lbs	1,260,585	Miscellaneous, lbs	758,815

MADISON.

Land, per cent in cultivation and pasture	50
of remainder that could be profitably enclosed	30
enclosed and cultivated has increased in last 10 years	14
in commercial timber	30

Principal agricultural productions, corn, wheat, oats and grass.

Principal live-stock, cattle, hogs, horses, sheep.

Minerals, lead, iron, zinc, copper.

Minerals developed, lead and nickel.

Topography, broken.

SHIPMENTS.

Cattle, hd	1,386	Dried fruit, lbs	2,000
Hogs, hd	9,120	Clover seed, bu	50
Horses, hd	40	Lumber, cars	533
Sheep, hd	1,600	Wood, cars	13
Mixed live-stock, cars	10	Ties, cars	80
Provisions, lbs	10,000	Staves, cars	38
Wheat, bus	8,000	Cooperage, cars	13
Corn, bus	91	Stone, cars	14
Hay, tons	140	Pig lead, cars	153
Hides, lbs	50,000	Nickel, car	1
Flour, lbs	8,720,000	Junk, cars	4
Shipstuff, lbs	96,000	Charcoal, cars	8

MARION.

Land, per cent in cultivation and pasture	85
of remainder that could be profitably enclosed	20
enclosed and cultivated has increased in last 10 years	13
that is swamp or wet	5
of swamp that could be reclaimed by drainage	75
in commercial timber	15

Principal agricultural productions, corn, wheat, oats, grass.

Principal live-stock, cattle, hogs.

Topography, rolling.

SHIPMENTS.

Cattle, hd	1,621	Game, lbs	419
Hogs, hd.	8,966	Fish, lbs.	6,440
Horses, hd.	580	Lard, lbs.	100
Sheep, hd	2,100	Packing-house products, lbs	364,397
Blood sheep, hd	4	Poultry, lbs	37,313
Blood hogs, hd	1	Eggs, doz	7,573
Wheat, bus.	8,800	Butter, lbs.	2,666
Corn, bus.	12,800	Lumber, cars	4,391
Oats, bus.	4,800	Barrels, cars.	5
Hay, tons	350	Stone, cars.	1,366
Flour, lbs	51,220,000	Lime, cars.	1,978
Shipstuff, lbs.	504,000	Ice, cars	64
Tomatoes, bus.	5	Junk, cars	2
Grapes, bas	193	Sand, cars	6
Pork, lbs.	159	Miscellaneous, lbs	24,546,438
Veal, lbs.	2,937		

MERCER.

Land, per cent in cultivation and pasture	95
of remainder that could be profitably enclosed	70
enclosed and cultivated has increased in last 10 years	20
that is swamp or wet	2
of swamp that could be reclaimed by drainage	90
in commercial timber	3

Principal agricultural productions, corn, wheat, grass.

Principal live-stock, cattle, hogs and horses.

Minerals, coal and stone.

Mineral developed, stone.

Topography, rolling to slightly broken.

SHIPMENTS.

Cattle, hd	4,195	Tallow, lbs	40,095
Hogs, hd	10,187	Poultry, lbs	81,825
Horses, hd	265	Eggs, doz	32,231
Sheep, hd	1,850	Butter, lbs	27,530
Blood horses, hd	27	Timothy seed, bus	1,325
Mixed live-stock, cars	10	Lumber, cars	8
Corn, bus	711	Piling, cars	12
Oats, bus	5,737	Ties, cars	20
Rye, bus	2,286	Wood, cars	48
Wool, lbs	13,470	Hoops, cars	9
Hides, lbs	41,225	Posts, cars	2
Nuts, bus	714	Stone, cars	30
Flour, lbs	39,305	Junk, cars	7
Nursery stock, lbs	4,590	Lime, car	1
Apples, brls	21	Tar, cars	3
Strawberries, crates	3	Charcoal, cars	39
Game, lbs	578	Miscellaneous, cars	375

MILLER.

Land, per cent in cultivation and pasture	45
of remainder that could be profitably enclosed	45
enclosed and cultivated has increased in last 10 years	25
in commercial timber	40

Principal agricultural productions, grass, corn, wheat, fruit, flax.

Principal live-stock, horses, cattle, hogs, sheep.

Minerals, iron, coal, lead, zinc, kaolin.

Minerals developed, coal, tiff.

Topography, undulating to broken.

SHIPMENTS.

Cattle, hd	2,113	Dried fruit, lbs	650
Hogs, hd	9,042	Tallow, lbs	885
Horses, hd	60	Poultry, lbs	85,948
Sheep, hd	1,700	Eggs, doz	76,615
Mixed live-stock, cars	22	Butter, lbs	2,775
Wheat, bus	15,367	Feathers, lbs	277
Tobacco, lbs	1,555	Seed, bus	21
Wool, lbs	5,115	Lumber, cars	5
Hides, lbs	15,054	Hoops, cars	6
Furs, lbs	355	Tiff, cars	25
Flour, lbs	2,500	Miscellaneous, lbs	200,000
Molasses, galls	1,525		

MISSISSIPPI.

Land, per cent in cultivation and pasture	46
of remainder that could be profitably enclosed	82
enclosed and cultivated has increased in last 10 years	18
that is swamp or wet	37
of swamp that can be reclaimed by drainage	26
in commercial timber	50

Principal agricultural productions, wheat, corn, potatoes, melons.

Principal live-stock, hogs, cattle, horses.

Topography, level.

SHIPMENTS.

Cattle, hd	1,474	Cabbage, cars	3
Hogs, hd	5,521	Melons, cars	71
Mixed stock, cars	18	Poultry, lbs	500
Wheat, bus	1,045,400	Wool, lbs	100
Mixed grain, cars	260	Baskets, cars	7
Potatoes, brls	7,206	Lumber, cars	2,045
Flour, lbs	11,320,000	Wood, cars	197
Shipstuff, lbs	1,884,000	Staves, cars	4
Corn meal, lbs	505,500	Junk, car	1
Vegetables, lbs	1,002,318	Other cars	7
Turnips, bus	2,094	Miscellaneous, lbs	235,285

MONITEAU.

Land, per cent in cultivation and pasture	90
of remainder that could be profitably enclosed	37
enclosed and cultivated has increased in last 10 years	15
in commercial timber	25

Principal agricultural productions, corn, wheat, oats, grass.

Principal live-stock, cattle, hogs, horses.

Minerals, coal, lead, iron.

Minerals developed, lead and coal.

Topography, undulating.

SHIPMENTS.

Cattle, hd	2,320	Veal, lbs	1,250
Hogs, hd	10,607	Game, lbs	9,108
Horses, hd	560	Oil, galls	1,191
Sheep, hd	2,905	Poultry, lbs	637,900
Blood hog, hd	1	Eggs, doz	664,158
Mixed live-stock, cars	89	Butter, lbs	36,200
Wheat, bus	116,469	Cheese, lbs	9,555
Corn, bus	10	Bread, lbs	1,815
Oats, bus	4,800	Feathers, lbs	80
Hay, tons	30	Timothy seed, bus	43
Wool, lbs	25,299	Clover seed, bus	3,647
Pelts, lbs	45	Lumber, cars	4
Hides, lbs	33,891	Logs, car	1
Furs, lbs	1,111	Wood, cars	158
Flour, lbs	406,745	Hoops, cars	7
Shipstuff, lbs	24,000	Lead ore, lbs	7,085
Nursery stock, lbs	30	Lime, car	1
Dried fruit, lbs	155	Junk, cars	3
Beer, galls	8,750	Other cars	17
Packing-house products, lbs	48,500	Miscellaneous, lbs	233,235
Pork, lbs	120		

MONROE.

Land, per cent in cultivation and pasture	92
of remainder that could be profitably enclosed	98
enclosed and cultivated has increased in last 10 years	15
that is swamp or wet	2
of swamp that could be reclaimed by drainage	100
in commercial timber	3

Principal agricultural productions, corn, wheat, oats, grass, tobacco.

Principal live-stock, cattle, hogs, sheep, horses.

Minerals, coal.

Minerals developed, coal.

Topography, undulating.

SHIPMENTS.

Cattle, hd	9,183	Veal, lbs	6,200
Hogs, hd	36,257	Game, lbs	112
Horses, hd	2,710	Poultry, lbs	1,238,997
Sheep, hd	28,775	Eggs, doz	195,114
Mixed stock, cars	7	Butter, lbs	133
Provisions, lbs	220	Feathers, lbs	1,065
Wheat, bus	42,877	Lumber, cars	9
Corn, bus	611	Ties, cars	46
Oats, bus	90,793	Wood, cars	151
Mixed grain, car	1	Hoops, cars	9
Hay, tons	1,430	Pottery, cars	3
Tobacco, lbs	13,331	Cement, car	1
Wool, lbs	78,362	Stone, cars	2
Hides, lbs	13,206	Junk, cars	9
Flour, lbs	3,902,145	Other cars	12
Shipstuff, lbs	32,560	Miscellaneous, lbs	2,218,993

MONTGOMERY.

Land, per cent in cultivation and pasture	80
of remainder that could be profitably enclosed	80
enclosed and cultivated has increased in last 10 years	30
in commercial timber	12

Principal agricultural productions, oats, wheat, corn, grass, fruit and tobacco.

Principal live-stock, hogs, cattle, sheep, horses.

Minerals, coal and fire-clay.

Minerals developed, coal and fire-clay.

Topography, level bottoms, undulating prairies, some broken bluffs.

SHIPMENTS.

Cattle, hd	4,550	Onions, bus	24
Hogs, hd	28,169	Pop-corn, bus	30
Horses, hd	383	Apples, brls	55
Sheep, hd	2,878	Pork, lbs	800
Mixed stock, cars	76	Game, lbs	1,540
Wheat, bus	48,325	Tallow, lbs	6,240
Corn, bus	3,547	Poultry, lbs	832,427
Oats, bus	178,308	Eggs, doz	293,668
Flax, car	1	Butter, lbs	42,287
Hay, tons	60	Cheese, lbs	1,000
Tobacco, lbs	1,597,801	Feathers, lbs	3,960
Potatoes, brls	32	Clover seed, bus	230
Wool, lbs	15,514	Lumber, cars	9
Pelts, lbs	900	Piling, cars	40
Hides, lbs	151,000	Ties, cars	420
Nuts, bus	141	Hoops, cars	27
Flour, lbs	330,000	Junk, cars	5
Millstuff, lbs	11,700	Clay, cars	7
Corn-meal, lbs	82,400	Miscellaneous, lbs	171,000
Honey, lbs	500		

MORGAN.

Land, per cent in cultivation and pasture	60
of remainder that could be profitably enclosed	57
enclosed and cultivated has increased in last 10 years	28
that is swamp or wet	5
of swamp that can be reclaimed by drainage	100
in commercial timber	40

Principal agricultural productions, corn, wheat, oats, grass.

Principal live-stock, cattle, hogs, sheep.

Minerals, coal, lead, black-jack, clay.

Minerals developed, coal, clay.

Topography, undulating to broken.

SHIPMENTS.

Cattle, hd	2,112	Butter, lbs	5,240
Hogs, hd	3,678	Canned goods, lbs	80,000
Horses, hd	20	Lumber, cars	2
Sheep, hd	2,000	Ties, cars	272
Mixed live-stock, cars	28	Wood, cars	14
Wheat, bus	20,000	Hoops, cars	8
Oats, bus	4,000	Coal, car	1
Flax, car	1	Junk, cars	2
Game, lbs	1,620	Clay, car	1
Poultry, lbs	32,110	Other cars	3
Eggs, doz	51,610	Miscellaneous, lbs	98,858

NEW MADRID.

Land, per cent in cultivation and pasture	25
of remainder that could be profitably enclosed	55
enclosed and cultivated has increased in last 10 years	50
that is swamp or wet	50
of swamp that can be reclaimed by drainage	75
in commercial timber	50

Principal agricultural productions, corn, wheat, hay, cotton, potatoes.

Principal live-stock, horses and mules, 138,000; cattle, 48,000.

Minerals, bog iron ore.

Topography, level bottom.

SHIPMENTS.

Cattle, hd	110	Vegetables, lbs	210,700
Hogs, hd	160	Melons, cars	2
Mixed stock, cars	54	Lumber, cars	5,120
Wheat, bus	4,800	Logs, cars	3
Corn, bus	1,634	Wood, cars	6
Mixed grain, cars	315	Junk, car	1
Hay, ton	1	Other cars	2
Flour, lbs	12,055	Micellaneous, lbs	647,661
Cotton, bales	97		

NEWTON.

Land, per cent in cultivation and pasture	60
of remainder that could be profitably enclosed	36
enclosed and cultivated increased in last 10 years	17

Principal agricultural productions, wheat, oats, corn, grass, tobacco, fruit.
Principal live-stock, hogs, cattle, horses.
Minerals, lead, zinc, tripoli.
Minerals developed, lead, zinc, tripoli.
Topography, broken.

SHIPMENTS.

Cattle, hd	1,385	Eggs, doz	363,211
Hogs, hd	5 565	Butter, lbs	9,260
Horses, hd	185	Feathers, lbs	100
Sheep, hd	52	Game, lbs	4,872
Wheat, bus	357,000	Lumber, cars	50
Mixed grain, cars	90	Ties, cars	5
Flax, car	1	Logs, car	1
Hay, tons	190	Wood, cars	24
Tobacco, lbs	7,435	Iron, cars	6
Potatoes, brls	972	Pig lead, cars	56
Wool, lbs	13,290	Lead ore, cars	3
Pelts, lbs	5,000	Zinc, cars	167
Hides, lbs	138,307	Coal, cars	50
Flour, lbs	18,313,668	Spelter, cars	10
Shipstuff, lbs	64,240	Junk, cars	2
Corn-meal, lbs	1,900	Tripoli, cars	73
Apples, brls	147	Sand, cars	13
Dried fruit, lbs	865	Other cars	5
Tallow, lbs	10,000	Miscellaneous, cars	85
Poultry, lbs	107,574		

NODAWAY.

Land, per cent in cultivation and pasture	91
of remainder that could be profitably enclosed	80
enclosed and cultivated has increased in last 10 years	30
that is swamp or wet	3
of swamp that could be reclaimed by drainage	95
in commercial timber	8

Principal agricultural productions, corn, wheat, oats, grass, fruit.

Principal live-stock, cattle, hogs, mules, horses.

Minerals, coal, lime, sand, stone, potters' clay.

Minerals developed, coal, lime.

Topography, small per cent level, remainder rolling.

SHIPMENTS.

Cattle hd	28,993	Apples, brls	856
Hogs, hd	70,651	Pork, lbs	1,520
Horses, hd	1,828	Veal, lbs	815
Sheep, hd	2,905	Game, lbs	524
Mixed stock, cars	78	Fruit, cars	3
Blood cattle, hd	1	Tallow, lbs	21,500
Blood hogs, hd	65	Poultry, lbs	1,451,654
Provisions, lbs	86,400	Eggs, doz	100,991
Wheat, bus	99,339	Butter	25,509
Corn, bus	559,669	Cheese, lbs	1,766
Oats, bus	35,969	Feathers, lbs	381
Rye, bus	1,900	Timothy seed, bus	6,596
Mixed grain, cars	2	Millet seed, lbs	1,084
Hay, tons	1,032	Lumber, cars	11
Potatoes, brls	1,225	Logs, cars	36
Wool, lbs	6,480	Wood, cars	78
Hides, lbs	374,640	Brick, cars	2
Flour, lbs	2,249,481	Tiling, cars	3
Shipstuff, lbs	23,910	Junk, cars	13
Corn-meal, lbs	23,320	Sand, cars	5
Honey, lbs	195	Sawdust, car	1
Molasses, galls	382	Other cars	67
Strawberries, crates	21	Miscellaneous, lbs	894,996

OREGON.

Land, per cent in cultivation and pasture	40
of remainder that could be profitably enclosed	80
enclosed and cultivated has increased in last 10 years	20
that is swamp or wet	2
of swamp that can be reclaimed by drainage	100
in commercial timber	55

Principal agricultural productions, corn, wheat, clover, cotton, fruit.

Principal live-stock, hogs, cattle, sheep, horses.

Topography, broken.

SHIPMENTS.

Cattle, hd	72	Cotton-seed, bus	938
Hogs, hd	3,657	Lumber, cars	210
Horses, hd	60	Coal, car	1
Corn, bus	643	Miscellaneous, lbs	272,000
Hay, tons	20	Other cars	2

OSAGE.

Land, per cent in cultivation and pasture	25
of remainder that could be profitably enclosed	86
enclosed and cultivated has increased in last 10 years	25
that is swamp or wet	3
of swamp that can be reclaimed by drainage	100
in commercial timber	18

Principal agricultural products, corn, wheat, grass, fruit.

Principal live-stock, cattle, hogs, horses, sheep.

Minerals, iron, lead.

Minerals developed, none.

Topography, broken.

SHIPMENTS.

Cattle, hd	682	Poultry, lbs	138,870
Hogs, hd	8,400	Eggs, doz	9,417
Horses, hd	20	Butter, lbs	1,675
Sheep, hd	1,100	Cream, galls	1,123
Mixed stock, car	1	Clover-seed, bus	321
Provisions, lbs	90,509	Lumber, cars	13
Wheat, bus	133,600	Ties, cars	136
Corn, bus	10,402	Telegraph poles, cars	2
Potatoes, brls	232	Wood, car	1
Wool, lbs	275	Hoops, cars	20
Hides, lbs	630	Corn-cobs, cars	9
Furs, lbs	200	Junk, cars	2
Flour, lbs	1,560,000	Other cars	16
Dried fruit, lbs	260	Miscellaneous, lbs	1,203,066

PERRY.

Land, per cent in cultivation and pasture	66
of remainder that could be profitably enclosed	60
enclosed and cultivated has increased in last 10 years	16
that is swamp or wet	3
of swamp that could be reclaimed by drainage	80
in commercial timber	15

Principal agricultural productions, wheat, corn, clover, fruit.

Principal live-stock, horses, cattle.

Minerals, lead, iron.

Minerals developed, lead in a limited way.

Topography, undulating to broken, level bottoms.

SHIPMENTS.

Cattle, hd	516	Dried fruit, lbs	22,800
Hogs, hd	4,177	Pork, lbs	1,000
Horses, hd	21	Fish, lbs	500
Sheep, hd	1,345	Lard, lbs	1,200
Wheat, bus	65,258	Tallow, lbs	1,600
Potatoes, brls	498	Grease, lbs	800
Wool, lbs	500	Poultry, lbs	47,900
Pelts, lbs	750	Eggs, doz	68,245
Hides, lbs	2,500	Butter, lbs	4,200
Nuts, bus	700	Feathers, lbs	250
Flour, lbs	3,100,000	Clover seed, bus	358
Honey, lbs	250	Lumber, cars	8
Beeswax, lbs	20	Logs, cars	3
Onions, bus	1,046	Miscellaneous, lbs	102,000
Pop-corn, bus	25		

This county has no railroad, and the above are all the reports we could receive from steamboat companies.

PETTIS.

Land, per cent in cultivation and pasture	92
of remainder that could be profitably enclosed	56
enclosed and cultivated has increased in last 10 years	7
in commercial timber	5

Principal agricultural productions, grass, corn, wheat, fruit.

Principal live-stock, cattle, hogs.

Minerals, coal.

Minerals developed, coal.

Topography, undulating to broken.

SHIPMENTS.

Cattle, hd	11,088	Mineral waters, lbs	4,045
Hogs, hd	22,308	Canned goods, lbs	600
Horses, hd	1,655	Beef, lbs	981
Sheep, hd	4,121	Game, lbs	845
Mixed stock, cars	56	Tallow, lbs	300
Provisions, lbs	12,770	Poultry, lbs	256,444
Wheat, bus	122,800	Eggs, doz	491,067
Corn, bus	38,504	Butter, lbs	17,772
Oats, bus	24,800	Feathers, lbs	100
Mixed grain, car	1	Garden seed, lbs	175
Hay, tons	1,190	Logs, cars	11
Flax, cars	5	Wood, cars	5
Broom-corn, bales	96	Ties, cars	4
Farm produce, lbs	1,249	Tiling, car	1
Wool, lbs	35,810	Stone, cars	19
Hides, lbs	653,082	Pottery, car	1
Furs, lbs	1,077	Junk, cars	23
Flour, lbs	4,122,342	Lime, cars	3
Millstuff, lbs	72,000	Other cars	10
Corn meal, lbs	181,000	Miscellaneous, lbs	340,218
Blackberries, crates	20		

PHELPS.

Land, per cent in cultivation and pasture	60
of remainder that could be profitably enclosed	45
enclosed and cultivated has increased in last 10 years	20
in commercial timber	8

Principal agricultural products, corn, wheat, grass, fruit.

Principal live-stock, cattle, hogs, horses, sheep.

Minerals, iron, lead, zinc, fire-clay.

Minerals developed, iron, fire-clay.

Topography, undulating to broken.

SHIPMENTS.

Cattle, hd	3,646	Game, lbs	17,360
Hogs, hd	11,184	Pork, lbs	375
Horses, hd	119	Lard, lbs	2,000
Sheep, hd	5,142	Tallow, lbs	3,855
Blood horses, hd	4	Poultry, lbs	141,599
Hay, tons	244	Eggs, doz	209,230
Mixed stock, car	1	Butter, lbs	5,390
Wheat, bus	78,355	Feathers, lbs	6,880
Potatoes, brls	527	Clover seed, bus	85
Wool, lbs	34,740	Lumber, cars	50
Pelts, lbs	500	Ties, car	1
Hides, lbs	44,320	Wood, cars	97
Flour, lbs	117,000	Hoops, cars	5
Shipstuff, lbs	231,100	Iron ore, cars	12
Corn-meal, lbs	100	Junk, cars	4
Nursery stock, lbs	20,000	Clay, cars	14
Castor beans, lbs	940	Sand, cars	138
Dried fruit, lbs	9,255	Other car	1
Wine, galls	200	Miscellaneous, lbs	500

PIKE.

Land, per cent in cultivation and pasture	85
of remainder that could be profitably enclosed	25
enclosed and cultivated increased in last 10 years	20
that is swamp or wet	2
of swamp or wet that can be reclaimed by drainage	75
in commercial timber	6

Principal agricultural productions, wheat, corn, oats, tobacco, grass.

Principal live-stock, cattle, hogs, horses.

Minerals, stone.

Mineral developed, stone.

Topography, east part broken, central and west undulating.

SHIPMENTS.

Cattle, hd	5,523	Shipstuff, lbs	48,000
Hogs, hd	22,971	Honey, lbs	100
Horses, hd	1,540	Game, lbs	144
Sheep, hd	5,330	Fish, lbs	27,475
Blood hogs, hd	2	Poultry, lbs	419,447
Mixed stock, cars	87	Eggs, doz	59,905
Wheat, bus	235,938	Butter, lbs	500
Corn, bus	13,648	Lumber, cars	1,329
Oats, bus	51,190	Brick, cars	127
Mixed grain, car	1	Stone, cars	101
Hay, tons	300	Lime, cars	100
Wool, lbs	36,110	Junk, cars	16
Hides, lbs	1,065	Wood, cars	315
Flour, lbs	9,985,000	Miscellaneous, lbs	16,356,694

PLATTE.

Land, per cent in cultivation and pasture	90
of remainder that could be profitably enclosed	80
enclosed and cultivated has increased in last 10 years	15
that is swamp or wet	2
of swamp or wet that can be reclaimed by drainage	80
in commercial timber	10

Principal agricultural productions, corn, wheat, grass.

Principal live-stock, cattle, hogs.

Topography, undulating, river bluffs, broken.

SHIPMENTS.

Cattle, hd	4,662	Whisky, galls	2,400
Hogs, hd	34,866	Game, lbs	400
Horses, hd	435	Pork, lbs	695
Sheep, hd	1,600	Fish, lbs	3,585
Blood horses, hd	6	Lard, lbs	880
Blood cattle, hd	23	Tallow, lbs	3,685
Blood hogs, hd	65	Grease, lbs	440
Mixed stock, cars	2	Poultry, lbs	20,295
Wheat, bus	437,593	Eggs, doz	41,260
Corn, bus	25,419	Butter, lbs	2,058
Oats, bus	1,906	Feathers, lbs	190
Straw, tons	9	Seed, bus	482
Potatoes, brls	34	Lumber, cars	47
Wool, lbs	1,757	Logs, cars	116
Hides, lbs	21,282	Wood, cars	494
Flour, lbs	2,389,913	Sawdust, car	1
Shipstuff, lbs	240,000	Coal, cars	7
Corn meal, lbs	150	Lime, car	1
Nursery stock, lbs	580	Ice, cars	3,424
Tomatoes, crates	26,834	Stone, cars	40
Strawberries, crates	3	Sand, cars	8
Blackberries, crates	6	Junk, cars	2
Apples, brls	2	Miscellaneous, lbs	640,293
Grapes, baskets	18		

POLK.

Land, per cent in cultivation and pasture	73
of remainder that could be profitably enclosed	90
enclosed and cultivated has increased in last 10 years	42
in commercial timber	11

Principal agricultural productions, wheat, corn, oats, grass.

Principal live-stock, cattle, hogs, horses, sheep.

Topography undulating, broken near streams.

SHIPMENTS.

Cattle, hd	2,659	Strawberries, crates	40
Hogs, hd	29,779	Dried fruit, lbs	7,570
Horses and mules, hd	1,903	Game, lbs	39,625
Sheep, hd	8,307	Tallow, lbs	1,340
Blood horses, hd	18	Poultry, lbs	348,721
Mixed live-stock, cars	21	Eggs, doz	443,590
Wheat, bus	57,243	Butter, lbs	3,415
Corn, bus	1,143	Farm produce, lbs	88,000
Flax, cars	7	Feathers, lbs	6,758
Hay, tons	76	Lumber, cars	44
Potatoes, brls	25	Posts, cars	5
Tobacco, lbs	170	Wood, cars	366
Wool, lbs	14,530	Hoops, car	1
Pelts, lbs	150	Stone, cars	21
Hides, lbs	37,670	Junk, cars	2
Furs, lbs	2,213	Charcoal, cars	226
Flour, lbs	1,950,022	Other cars	593
Nursery stock, lbs	665		

PULASKI.

Land, per cent in cultivation and pasture	40
of remainder that could be profitably enclosed	40
enclosed and cultivated has increased in last 10 years	17
that is swamp or wet	3
of swamp that can be reclaimed by drainage	51
in commercial timber	25

Principal agricultural productions, corn, wheat, grass, fruit.

Principal live-stock, cattle, hogs, sheep, horses.

Minerals, iron, lead, zinc, onyx.

Topography, broken.

SHIPMENTS.

Cattle, hd	4,332	Game, lbs	24,789
Hogs, hd	15,796	Lard, lbs	295
Horses, hd	88	Tallow, lbs	1,865
Sheep, hd	2,367	Poultry, lbs	256,249
Mixed stock, hd	6,897	Eggs, doz	290,578
Wheat, bus	58,084	Butter, lbs	3,010
Wool, lbs	36,789	Feathers, lbs	2,485
Pelts, lbs	405	Lumber, cars	10
Hides, lbs	40,803	Ties, cars	15
Flour, lbs	204,294	Posts, cars	2
Shipstuff, lbs	141,800	Shingles, car	1
Corn-meal, lbs	58,236	Stone, car	1
Beeswax, lbs	30	Coal, car	1
Beans, lbs	130	Other car	12
Furs, lbs	1,242	Miscellaneous, lbs	95,000
Dried fruit, lbs	5,702		

PUTNAM.

Land, per cent in cultivation and pasture	90
of remainder that could be profitably enclosed	100
enclosed and cultivated has increased in last 10 years	50
that is swamp or wet	10
of swamp that can be reclaimed by drainage	90
in commercial timber	10

Principal agricultural productions, wheat, corn, grass.

Principal live-stock, cattle, sheep, hogs, horses.

Minerals, coal, stone.

Minerals developed, coal.

Topography, undulating to broken.

SHIPMENTS.

Cattle, hd	6,606	Dried fruit, lbs	240
Hogs, hd	4,207	Beef, lbs	1,500
Horses, hd	322	Game, lbs	780
Sheep, hd	935	Tallow, lbs	150
Mixed stock, cars	3	Grease, lbs	780
Blood horses, hd	3	Poultry, lbs	71,595
Wheat, bus	7,820	Eggs, doz	48,135
Corn, bus	2,813	Butter, lbs	54,220
Oats, bus	1,720	Feathers, lbs	550
Flax, car	1	Timothy seed, bus	1,042
Mixed grain, car	1	Lumber, cars	4
Potatoes, brls	30	Logs, cars	5
Wool, lbs	3,130	Wood, cars	2
Pelts, lbs	115	Hoops, cars	7
Hides, lbs	17,375	Junk, car	1
Nuts, bus	189	Lime, cars	2
Flour, lbs	700	Coal, cars	3,723
Shipstuff, lbs	48,000	Ties, cars	9
Beeswax	200	Other cars,	4
Strawberries, crates	10	Miscellaneous, lbs	20,000
Apples, brls	53		

RALLS.

Land, per cent in cultivation and pasture	77
of remainder that could be profitably enclosed	90
enclosed and cultivated has increased in last 10 years	25
that is swamp or wet	5
of swamp that can be reclaimed by drainage	80
in commercial timber	10

Principal agricultural productions, corn, wheat, oats, grass.

Principal live-stock, hogs, cattle, horses.

Minerals, coal.

Mineral developed, coal.

Topography, undulating to broken

SHIPMENTS.

Cattle, hd	411	Fish, lbs	3,290
Hogs, hd	3,282	Poultry, lbs	29,447
Horses, hd	22	Eggs, doz	1,720
Sheep, hd	1,363	Butter, lbs	1,430
Mixed stock, cars	20	Feathers, lbs	1,000
Wheat, bus	29,671	Lumber, cars	19
Corn, bus	654	Piling, cars	3
Oats, bus	9,645	Ties, cars	41
Provisions, lbs	1,200	Wood, cars	157
Hay, tons	120	Posts, cars	3
Broom-corn, bales	300	Hoops, car	1
Tobacco, lbs	100	Brick, cars	5
Flour, lbs	20,630	Miscellaneous	35,523
Berries, crates	10		

RANDOLPH.

Land, per cent in cultivation and pasture	85
of remainder that could be profitably enclosed	86
enclosed and cultivated has increased in last 10 years	20
that is swamp or wet	6
of swamp that could be reclaimed by drainage	80
in commercial timber	4

Principal agricultural productions, corn, grass, wheat.

Principal live-stock, cattle, hogs, horses.

Minerals, coal.

Minerals developed, coal.

Topography, undulating to broken.

SHIPMENTS.

Cattle, hd	7,067	Nursery stock, lbs	21,000
Hogs, hd	19,438	Honey, lbs	90
Horses and mules, hd	962	Molasses, galls	25
Sheep, hd	15,498	Dried fruit, lbs	50
Mixed stock, cars	65	Beef, lbs	280
Blood horses, hd	27	Pork, lbs	370
Blood cattle, hd	6	Tallow, lbs	195,600
Blood sheep, hd	14	Poultry, lbs	185,633
Blood hogs, hd	38	Eggs, doz.	16,341
Fancy poultry, hd	135	Butter, lbs	16,431
Provisions, lbs	711	Feathers, lbs	10,254
Wheat, bus	8,468	Lumber, cars	24
Corn, bus	1,536	Piling, cars	44
Oats, bus	1,465	Ties, cars	372
Hay, tons	244	Logs, cars	3
Wool, lbs	93,587	Staves, cars	2
Pelts, lbs	34,150	Hoops, cars	44
Hides, lbs	489,900	Brick, cars	154
Furs, lbs	2,948	Coal, cars	6,455
Flour, lbs	3,205,742	Junk, cars	11
Millstuff, lbs	32,800	Miscellaneous, lbs	6,771,168

RAY.

Land, per cent in cultivation and pasture	90
of remainder that could be profitably enclosed	70
enclosed and cultivated has increased in last 10 years	20
in commercial timber	6

Principal agricultural productions, wheat, corn, oats, hemp, grass.

Principal live-stock, value horses, $427,000; mules, $150,000; cattle, $315,000.

Mineral, coal.

Mineral developed, coal.

Topography, one-half undulating prairie, remainder rolling.

SHIPMENTS.

Cattle, hd	10,379	Fish, lbs	100
Hogs, hd	34,778	Tallow, lbs	2,290
Horses and mules, hd	257	Poultry, lbs	265,576
Sheep, hd	4,285	Eggs, doz	189,233
Blood horses, hd	4	Butter, lbs	58,685
Mixed live-stock, cars	11	Cheese, lbs	38,000
Wheat, bus	111,080	Feathers, lbs	200
Corn, bus	9,086	Timothy seed, bus	30
Oats, bus	1,063	Melons, car	1
Hay, tons	36	Lumber, cars	635
Potatoes, brls	186	Piling, car	1
Vegetables, lbs	20,000	Ties, cars	187
Wool, lbs	3,435	Logs, cars	13
Hides, lbs	35,605	Wood, cars	9
Nuts, bus	2,326	Sawdust, cars	42
Flour, lbs	1,343,000	Posts, car	1
Shipstuff, lbs	123,000	Stone, cars	6
Corn-meal, lbs	730	Sand, car	1
Nursery stock, lbs	130	Charcoal, car	1
Dried fruit, lbs	130	Provisions, lbs	895
Pork, lbs	3,000	Coal, cars	10,029
Game, lbs	13,290	Miscellaneous, lbs	600

RIPLEY.

Land, per cent in cultivation and pasture	20
of remainder that coald be profitably enclosed	70
enclosed and cultivated has increased in last 10 years	25
that is swamp or wet	5
of swamp or wet that could be reclaimed by drainage	80
in commercial timber	55

Principal agricultural productions, corn, wheat, oats, hay, fruit.

Principal live-stock, hogs, horses, cattle.

Minerals, iron.

Topography, level in south to broken in north.

SHIPMENTS.

Cattle, hd	924	Dried fruit, lbs	600
Hogs, hd	4,400	Poultry, lbs	1,600
Sheep, hd	200	Lumber, cars	397
Mixed stock, cars	3	Junk, car	1

ST. CHARLES.

SHIPMENTS.

Cattle, hd	1,570	Dried fruit, lbs	15,310
Hogs, hd	8,043	Canned fruit, lbs	200
Horses, hd	65	Wine, lbs	50,000
Sheep, hd	1,862	Veal, lbs	17,735
Mixed stock, cars	56	Pork, lbs	935
Provisions, lbs	22,700	Bacon and hams, lbs	10,000
Wheat, bus	468,266	Game, lbs	180
Corn, bus	24,350	Tallow, lbs	4,260
Oats, bus	7,600	Poultry, lbs	255,470
Mixed grain, cars	2	Eggs, doz	339,335
Hay, tons	55	Butter, lbs	40,285
Tobacco, leaf, lbs	397,832	Feathers, lbs	310
Tobacco, manufactured, lbs	40,000	Clover seed, bus	986
Potatoes, brls	409	Lumber, cars	2
Farm produce, lbs	56,630	Ties, cars	115
Wool, lbs	2,175	Logs, cars	2
Pelts, lbs	725	Wood, cars	304
Hides, lbs	17,928	Hoops, car	1
Nuts, bus	72	Brick, cars	16
Flour, lbs	13,638,316	Stone, cars	150
Shipstuff, lbs	84,400	Junk, cars	2
Honey, lbs	2,500	Sand, cars	11
Onions, bus	150	Clay, car	1
Peaches, crates	368	Corn-cobs, cars	2
Berries, crates	83	Other cars	10
Grapes, baskets	637	Miscellaneous, lbs	102,500

There is no report of the business of the Wabash at St. Charles station.

ST. CLAIR.

Land, per cent in cultivation and pasture	86
of remainder that could be profitably enclosed	45
enclosed and cultivated has increased in last 10 years	14
that is swamp or wet	5
in commercial timber	7

Principal agricultural productions, wheat, corn, oats, hay, flax.

Principal live-stock, cattle, hogs, horses and mules.

Minerals, coal—possibly iron and lead.

Minerals developed, coal.

Topography, undulating to broken.

SHIPMENTS.

Cattle, hd	4,640	Fish, lbs	1,561
Hogs, hd	20,057	Poultry, lbs	108,893
Horses and mules, hd	508	Eggs, doz	99,265
Sheep, hd	3,275	Butter, lbs	3,887
Blood cattle, hd	1	Cheese, lbs	35,445
Wheat, bus	53,000	Feathers, lbs	55
Corn, bus	66,786	Lumber, cars	79
Oats, bus	23,225	Ties, cars	2
Flax, cars	33	Wood, cars	4
Hay, tons	3,919	Coal, cars	255
Farm produce, lbs	22,000	Ice, cars	4
Wool, lbs	2,750	Brick, cars	95
Hides, lbs	13,873	Junk, cars	2
Flour, lbs	120,000	Other cars	21
Game, lbs	5,078	Miscellaneous, lbs	869,460

ST. FRANCOIS.

Land, per cent in cultivation and pasture	50
of remainder that could be profitably enclosed	65
enclosed and cultivated has increased in last 10 years	37
in commercial timber	18

Principal agricultural productions, wheat, corn, timothy, clover, fruit.

Principal live-stock, cattle, hogs, horses and mules.

Minerals, iron, lead, zinc, granite.

Minerals developed, iron, lead, zinc, granite.

Topography, undulating to broken.

SHIPMENTS.

Cattle, hd	1,608	Brick, cars	2
Hogs, hd	3,280	Stone, cars	386
Horses, hd	20	Granite, cars	1,177
Sheep, hd	700	Iron ore, cars	2,027
Mixed stock, cars	42	Tiff, cars	144
Wheat, bus	2,184	Pig lead, cars	5
Hay, tons	122	Lead ore, cars	3,493
Wool, lbs	545	Zinc, cars	41
Hides, lbs	43,650	Junk, cars	2
Flour, lbs	3,214,113	Sand, cars	300
Millstuff, lbs	145,604	Charcoal, car	1
Butter, lbs	670	Fertilizers, car	1
Lumber, car	1	Coke, cars	5
Wood, cars	290	Other cars	17
Hoops, cars	67	Miscellaneous, lbs	3,811,580
Wagon hubs	13		

ST. LOUIS.

Land, per cent in cultivation and pasture	75
of remainder that could be profitably enclosed	81
enclosed and cultivated has increased in last 10 years	30

Principal agricultural productions, corn, wheat, vegetables, fruit.

Principal live-stock, hogs, dairy-cows, horses.

Minerals, coal, clay, limestone.

Minerals developed, coal, clay, limestone.

Topography, undulating to broken.

SHIPMENTS.

Cattle, hd	530	Lard, lbs	359
Hogs, hd	2,087	Poultry, lbs	17,749
Horses, hd	26	Eggs, doz	11,770
Sheep, hd	799	Butter, lbs	5,528
Dogs, hd	25	Milk, galls	69,400
Mixed stock, cars	19	Willows, lbs	220
Provisions, lbs	921	Lumber, cars	12
Bread, lbs	62,500	Logs, cars	69
Wheat, bus	327,566	Wood, cars	695
Corn, bus	14,852	Staves, cars	61
Oats, bus	2,402	Hoops, cars	16
Mixed grain, car	1	Posts, car	1
Straw, tons	30	Brick, cars	2,066
Hay, tons	840	Fire-brick, cars	1,100
Vegetables, lbs	360	Tiling, cars	1,318
Potatoes, brls	1,075	Stone, cars	1,564
Wool, lbs	5,199	Pig-lead, cars	555
Pelts, lbs	20	White-lead, cars	546
Hides, lbs	1,900	Terra cotta, cars	40
Nuts, bus	13	Fire-clay, cars	1,690
Flour, lbs	1,519,600	Lime, cars	1,049
Shipstuff, lbs	4,140	Ice, cars	1,631
Corn-meal, lbs	5,100	Sand, cars	634
Nursery stock, lbs	100	Fertilizers, cars	8
Pop-corn, bus	265	Corn-cobs, cars	2
Peaches, crates	1,456	Iron-ore, cars	17
Cherries, lbs	200	Paving-block, cars	2
Berries, crates	4	Coke, cars	2,528
Beef, lbs	8,007	Other cars	7
Pork, lbs	217	Miscellaneous, lbs	1,634,206
Game, lbs	150		

SALINE.

Land, per cent in cultivation and pasture	85
of remainder that could be profitably enclosed	65
enclosed and cultivated has increased in last 10 years	15
that is swamp or wet	4
of swamp that can be reclaimed by drainage	50

Principal agricultural productions, corn, wheat, oats, grass, hemp.

Principal live-stock, cattle, horses, hogs, sheep.

Minerals, coal, salt, lead.

Mineral developed, coal in limited quantity.

Topography, undulating, breaks on streams.

SHIPMENTS.

Cattle, hd	23,183	Shipstuff, lbs	3,978,300
Hogs, hd	39,744	Nursery stock, lbs	1,250
Horses, hd	2,711	Onions, bus	17
Sheep, hd	6,913	Game, lbs	13,462
Mixed stock, cars	9	Fish, lbs	1,379
Provisions, lbs	480,000	Poultry, lbs	71,184
Wheat, bus	437,682	Eggs, doz	7,890
Corn, bus	128,820	Feathers, lbs	4,520
Oats, bus	4,318	Lumber, cars	105
Broom-corn, bales	45	Saddle-tree forks, cars	5
Hay, tons	290	Staves, car	1
Potatoes, brls	283	Brick, cars	36
Wool, lbs	103,452	Tiling, cars	5
Hides, lbs	250,925	Junk, cars	6
Furs, lbs	603	Cobs, car	1
Flour, lbs	24,084,381	Miscellaneous, cars	309

SCHUYLER.

Land, per cent in cultivation and pasture	90
of remainder that could be profitably enclosed	95
enclosed and cultivated has increased in last 10 years	13
in commercial timber	4

Principal agricultural productions, corn, wheat, oats, grass, tobacco.

Principal live-stock, cattle, sheep, hogs, horses.

Minerals, coal, clay.

Minerals developed, coal.

Topography, level prairie and undulating.

SHIPMENTS.

Cattle, hd	7,050	Dried fruit, lbs	206
Hogs, hd	21,617	Beef, lbs	506
Horses, hd	1,014	Pork, lbs	150
Sheep, hd	7,805	Game, lbs	5,990
Blood horses, hd	11	Tallow, lbs	2,340
Mixed stock, car	1	Poultry, lbs	407,710
Wheat, bus	600	Eggs, doz	225,550
Corn, bus	9,471	Butter, lbs	82,228
Oats, bus	48,408	Cream, galls	2,000
Broom-corn, lbs	500	Feathers, lbs	8,350
Hay, tons	90	Timothy seed, bus	1,556
Tobacco, lbs	122,835	Hungarian seed, bus	3,795
Potatoes, brls	500	Millet seed, bus	600
Wool, lbs	348,899	Lumber, cars	71
Pelts, lbs	1,020	Ties, cars	303
Hides, lbs	214,904	Logs, cars	5
Nuts, bus	3,433	Wood, cars	55
Flour, lbs	92,080	Hoops, cars	49
Shipstuff, lbs	209,920	Ax-handles, cars	6
Corn-meal, lbs	1,350	Posts, cars	4
Peaches, crates	1,311	Piling, cars	5
Nursery stock, lbs	2,330	Coal, cars	10
Honey, lbs	1,030	Junk, cars	2
Beeswax, lbs	375	Other cars	6
Molasses, galls	530	Miscellaneous, lbs	3,260

No returns from Glenwood of wheat, corn, oats, potatoes, fruit, hides, nuts, flour, poultry, eggs, butter or seed.

SCOTLAND.

Land, per cent in cultivation and pasture	95
of remainder that could be profitably enclosed	95
enclosed and cultivated has increased in last 10 years	17

Principal agricultural productions, grass, corn, oats.

Principal live-stock, cattle, horses, hogs.

Topography, level to undulating.

SHIPMENTS.

Cattle, hd	3 350	Cucumbers, brls	1,200
Hogs, hd	14,550	Sweet corn, crate	1
Horses, hd	1,183	Wine, galls	1,425
Sheep, hd	4,350	Game, lbs	2,570
Wheat, bus	9,890	Tallow, lbs	1,900
Corn, bus	2,764	Poultry, lbs	818,186
Oats, bus	107,297	Eggs, doz	293,600
Barley, bus	1,404	Butter, lbs	47,725
Hay, tons	132	Feathers, lbs	8,355
Wool, lbs	127,845	Timothy seed, bus	1,965
Pelts, lbs	675	Lard, lbs	700
Hides, lbs	71,190	Meat, lbs	1,275
Furs, lbs	628	Lumber, cars	64
Nuts, bus	500	Ties, cars	89
Flour, lbs	505,540	Logs, car	1
Shipstuff, lbs	2,000	Wood, cars	35
Corn-meal, lbs	3,900	Hoops, cars	2
Honey, lbs	100	Brick, cars	2
Beeswax, lbs	400	Junk, cars	6
Molasses, galls	1,950	Miscellaneous, lbs	1,019

SCOTT.

Land, per cent in cultivation and pasture	70
of remainder that could be profitably enclosed	75
enclosed and cultivated has increased in last 10 years	25
that is swamp or wet	7
of swamp that could be reclaimed by drainage	70
in commercial timber	7

Principal agricultural productions, wheat, corn, clover, timothy, melons.

Principal live-stock, hogs, cattle, mules, horses.

Minerals, lithograph stone.

Minerals developed, lithograph stone.

Topography, 35 per cent broken, remainder level to undulating.

SHIPMENTS.

Cattle, hd	1,870	Melons, cars	1,325
Hogs, hd	2,960	Canned fruit, cars	2
Mixed stock, cars	15	Tallow, lbs	570
Wheat, bus	332,000	Clover seed, bus	292
Corn, bus	385,564	Cotton seed, bus	2,400
Mixed grain, cars	5	Poultry, lbs	1,250
Potatoes, brls	273	Lumber, cars	831
Wool, lbs	411	Piling, car	1
Hides, lbs	2,920	Staves, cars	49
Flour, lbs	2,987,500	Stave-bolts, cars	3
Shipstuff, lbs	1,032,000	Junk, car	1
Corn-meal, lbs	800,000	Other cars	10
Cotton, cars	4	Miscellaneous, lbs	17,330

SHANNON.

Land, per cent in cultivation and pasture	10
of remainder that could be profitably enclosed	45
enclosed and cultivated has increased in last 10 years	50
in commercial timber	75

Principal agricultural productions, wheat, corn, oats, grass.

Principal live-stock, hogs, cattle, horses.

Minerals, iron, probably copper, lead and zinc.

Topography, east and north broken, south and west undulating.

SHIPMENTS.

Cattle, hd	166	Logs, cars	575
Hogs, hd	1,377	Ties, cars	207
Sheep, hd	500	Other cars	13
Lumber, cars	5,913	Miscellaneous, lbs	240,000

SHELBY.

Land, per cent in cultivation and pasture	84
of remainder that could be profitably enclosed	90
enclosed and cultivated has increased in last 10 years	20
that is swamp or wet	5
of swamp that could be reclaimed by drainage	75
in commercial timber	17

Principal agricultural productions, corn, wheat, oats and grass.

Principal live-stock, cattle, hogs, horses.

Minerals, coal.

Minerals developed, coal.

Topography, level prairie, rolling timber land.

SHIPMENTS.

Cattle, hd	8,998	Pork, lbs	125
Hogs, hd	38,000	Veal, lbs	1,500
Horses, hd	1,420	Game, lbs	1,000
Sheep, hd	6,800	Poultry, lbs	106,696
Blood horses, hd	1	Eggs, doz	7,240
Blood cattle, hd	3	Butter, lbs	500
Blood sheep, hd	10	Feathers, lbs	200
Blood hogs, hd	36	Seed, car	1
Mixed stock, cars	4	Lumber, cars	4
Wheat, bus	7,200	Wood, cars	22
Corn, bus	15,200	Hoops, cars	16
Oats, bus	28,000	Ties, cars	9
Hay, tons	2,790	Junk, cars	6
Flour, lbs	40,000	Other cars	7
Tobacco, lbs	210	Miscellaneous, lbs	240,000
Berries, crates	20		

STODDARD.

Land, per cent in cultivation and pasture	55
of remainder that could be profitably enclosed	45
enclosed and cultivated has increased in last 10 years	25
that is swamp or wet	20
of swamp that could be reclaimed by drainage	80
in commercial timber	30

Principal agricultural productions, corn, wheat, clover, grass.

Principal live-stock, hogs, cattle, horses, mules.

Minerals, iron.

Minerals developed, none.

Topography, 50 per cent level, remainder rolling.

SHIPMENTS.

Cattle, hd	638	Eggs, doz	22,870
Hogs, hd	3,920	Feathers, lbs	485
Horses and mules, hd	40	Cotton seed, lbs	1,160,000
Sheep, hd	200	Cotton-seed products, lbs	193,650
Mixed stock, cars	177	Lumber, cars	3,475
Provisions, lbs	102,203	Wood, cars	115
Wheat, bus	81,600	Piling, cars	99
Corn, bus	50,400	Ties, cars	1,499
Oats, bus	800	Logs, cars	23
Mixed grain, cars	62	Staves, cars	172
Hay, tons	20	Stave bolts, cars	122
Vegetables, lbs	73,805	Cooperage, cars	271
Wool, lbs	855	Shingles, cars	29
Hides, lbs	443	Barrels, cars	2
Flour, lbs	7,330,643	Stone, cars	1
Shipstuff, lbs	789,064	Brick, cars	14
Nursery stock, lbs	1,117	Junk, car	1
Cotton, bales	2,417	Other cars	31
Strawberries, crates	70	Miscellaneous, lbs	1,160,364
Poultry, lbs	46,805		

SULLIVAN.

Land, per cent in cultivation and pasture	93
of remainder that could be profitably enclosed	99
enclosed and cultivated has increased in last 10 years	30
that is swamp or wet	5
of swamp or wet that could be reclaimed by drainage	100
in commercial timber	5

Principal agricultural productions, corn, wheat, grass, oats, fruit.

Principal live-stock, cattle, hogs, horses, sheep.

Minerals, coal.

Minerals developed, coal.

Topography, undulating, rolling.

SHIPMENTS.

Cattle, hd	16,369	Honey and wax, lbs	90
Hogs, hd	11,028	Molasses, galls	470
Horses, hd	819	Apples, brls	102
Sheep, hd	2,884	Meat, lbs	155
Mixed live-stock, cars	3	Tallow, lbs	140
Blood hogs, hd	3	Poultry, lbs	322,585
Provisions, lbs	51,550	Eggs, doz	230,650
Wheat, bus	1,145	Butter, lbs	86,435
Corn, bus	4,815	Feathers, lbs	235
Oats, bus	2,428	Timothy seed, bus	3,250
Broom-corn, bales	289	Millet, bus	800
Hay, tons	10	Lumber, cars	6
Potatoes, brls	16	Ties, cars	58
Wool, lbs	12,610	Wood, cars	98
Pelts, lbs	525	Hoops, cars	31
Hides, lbs	39,615	Brick, cars	6
Nuts, bus	473	Stone, cars	40
Flour, lbs	199,865	Coal, cars	107
Shipstuff, lbs	123,350	Other cars	9
Corn-meal, lbs	5,610	Miscellaneous, lbs	99,230

TEXAS.

Land, per cent in cultivation and pasture	45
of remainder that could be profitably enclosed	85
enclosed and cultivated has increased in last 10 years	35
in commercial timber	20

Principal agricultural productions, corn, wheat, grass, fruit.

Principal live-stock, cattle, hogs, horses.

Mineral, iron.

Topography, mountainous to undulating.

SHIPMENTS.

Cattle, hd	1.034	Farm produce, lbs	44,000
Hogs, hd	5,029	Lumber, lbs	2,247
Horses, hd	140	Ties, lbs	1,047
Corn, bus	2,000	Other cars	3
Flour, lbs	180,000	Miscellaneous, lbs	498,000

VERNON.

Land, per cent in cultivation and pasture	85
of remainder that could be profitably enclosed	80
enclosed and cultivated has increased in last 10 years	34
in commercial timber	7

Principal agricultural productions, corn, wheat, oats, flax, castor beans.

Principal live-stock, cattle, hogs, sheep, horses.

Minerals, coal.

Mineral developed, coal.

Topography, gently undulating.

SHIPMENTS.

Cattle, hd	14,544	Tallow, lbs	1,010
Hogs, hd	25,371	Vegetables, lbs	93,751
Horses, hd	1,062	Poultry, lbs	396,840
Sheep, hd	500	Eggs, doz	168,625
Mixed stock, cars	40	Butter, lbs	68,149
Provisions, lbs	3,210	Feathers, lbs	150
Wheat, bus	71,500	Timothy seed, bus	227
Corn, bus	106,961	Millet seed, bus	800
Oats, bus	84,725	Broom-corn seed, bus	800
Flax, cars	59	Lumber, cars	52
Broom-corn, bales	24	Wood, cars	19
Hay, tons	13,580	Logs, cars	4
Flax straw, tons	17	Cooperage, cars	25
Mixed grain, cars	83	Barrels, cars	36
Wool, lbs	1,420	Sawdust, car	1
Hides, lbs	139,861	Brick, cars	98
Pelts, lbs	200	Tiling, car	1
Furs, lbs	830	Stone, cars	16
Flour, lbs	3,407,230	Coal, cars	767
Millstuff, lbs	360,000	Pottery, cars	2
Nursery stock, lbs	382,640	Ice, cars	8
Honey, lbs	120	Junk, cars	6
Castor beans, cars	55	Clay, cars	121
Blackberries, crates	43	Sand, cars	4
Strawberries, crates	35	Spelter, cars	230
Apple cores, car	1	Salt, cars	2
Dried fruit, lbs	10,592	Other cars	110
Pork, lbs	465	Miscellaneous, lbs	2,190,340
Game, lbs	7,510		

WARREN.

Land, per cent in cultivation and pasture	57
of remainder that could be profitably enclosed	43
enclosed and cultivated has increased in last 10 years	15
in commercial timber	15

Principal agricultural productions, wheat, corn, oats, clover, fruit.

Principal live-stock, hogs, cattle, horses, mules.

Topography, level to broken.

SHIPMENTS.

Cattle, hd	902	Poultry, lbs	364,166
Hogs, hd	5,123	Eggs, doz	229,200
Horses, hd	40	Butter, lbs	9,011
Sheep, hd	952	Feathers, lbs	930
Mixed stock, cars	23	Timothy seed, bus	235
Wheat, bus	64,940	Clover seed, bus	340
Oats, bus	14,200	Lumber, car	1
Corn, bus	2,880	Piling, cars	326
Mixed grain, cars	10	Ties, cars	1,350
Provisions, lbs	39,399	Wood, cars	144
Wool, lbs	18,825	Hoops, cars	15
Pelts, lbs	900	Chair lumber, cars	18
Hides, lbs	28,574	Posts, cars	44
Nuts, bus	991	Stone, car	1
Flour, lbs	1,435,500	Cobs, cars	2
Shipstuff, lbs	72,000	Junk, cars	4
Fruit, cars	4,000	Clay, cars	146
Game, lbs	1,200	Other cars	5
Tallow, lbs	3,480	Miscellaneous, lbs	23,010

WASHINGTON.

Land, per cent in cultivation and pasture	30
of remainder that could be profitably enclosed	50
enclosed and cultivated has increased in last 10 years	8
in commercial timber	45

Principal agricultural productions, corn, wheat, grass.

Principal live-stock, cattle, hogs, horses.

Minerals, lead, zinc, iron.

Minerals developed, lead.

Topography, broken.

SHIPMENTS.

Cattle, hd	383	Butter, lbs	3,000
Hogs, hd	1,520	Milk, galls	4,475
Horses, hd	22	Feathers, lbs	1,000
Sheep, hd	500	Clover seed, bus	110
Mixed stock, cars	25	Lumber, cars	6
Wheat, bus	12,013	Wood, cars	262
Corn, bus	800	Hoops, car	1
Oats, bus	353	Granite, cars	78
Hay, tons	100	Lead ore, cars	19
Wool, lbs	15,204	Pig lead, cars	24
Hides, lbs	20,505	Tiff, cars	383
Flour, lbs	80,000	Slag, cars	2
Shipstuff, lbs	24,000	Charcoal, cars	60
Dried fruit, lbs	565	Corn-cobs, car	1
Provisions, lbs	700	Junk, car	1
Poultry, lbs	17,150	Other cars	1
Eggs, doz	11,845	Miscellaneous, lbs	3,400

WAYNE.

Land, per cent in cultivation and pasture	30
of remainder that could be profitably enclosed	50
enclosed and cultivated has increased in last 10 years	22
that is swamp or wet	5
of swamp that can be reclaimed by drainage	70
in commercial timber	50

Principal agricultural productions, corn, wheat, oats, grasses, fruit.

Principal live-stock, horses, cattle, mules and hogs.

Minerals, iron.

Topography, broken, some level bottoms.

SHIPMENTS.

Cattle, hd	2,706	Eggs, doz	42,280
Hogs, hd	4,080	Butter, lbs	85
Horses, hd	60	Feathers, lbs	775
Sheep, hd	300	Clover seed, bus	15
Mixed live-stock, cars	6	Lumber, cars	2,632
Provisions, lbs	2,500	Piling, cars	154
Wheat, bus	800	Ties, cars	460
Hay, tons	280	Logs, cars	6
Wool, lbs	2,977	Staves, cars	361
Hides, lbs	12,000	Hoops, cars	2
Flour, lbs	641,200	Sawdust, cars	4
Strawberries, crates	61	Cooperage, cars	8
Pork, lbs	150	Granite, cars	13
Game, lbs	2,167	Junk, cars	5
Poultry, lbs	29,467	Other cars	11

WEBSTER.

Land, per cent in cultivation and pasture	44
of remainder that could be profitably enclosed	43
enclosed and cultivated has increased in last 10 years	31
that is swamp or wet	4
of swamp that can be reclaimed by drainage	100
in commercial timber	20

Principal agricultural productions, hay, corn, wheat, tobacco, fruit.

Principal live-stock, cattle, hogs, horses, sheep.

Minerals, lead, zinc, iron.

Mineral developed, lead.

Topography, undulating to broken.

SHIPMENTS.

Cattle, hd	3,841	Game, lbs	55,550
Hogs, hd	13,562	Tallow, lbs	600
Horses and mules, hd	406	Poultry, lbs	145,205
Sheep, hd	3,682	Eggs, doz	130,455
Wheat, bus	121,628	Butter, lbs	4,020
Farm produce, lbs	44,000	Feathers, lbs	2,255
Hay, tons	42	Lumber, cars	159
Hides, lbs	14,033	Ties, cars	866
Wool, lbs	36,455	Wood, cars	673
Flour, lbs	586,450	Brick, cars	51
Shipstuff, lbs	600	Iron, car	1
Corn-meal, lbs	308	Junk, cars	3
Molasses, galls	132	Other cars	5
Dried fruit, lbs	12,905	Miscellaneous, lbs	572,000

WORTH.

Land, per cent in cultivation and pasture	92
of remainder that could be profitably enclosed	90
enclosed and cultivated has increased in last 10 years	22
in commercial timber	10

Principal agricultural productions, corn, wheat, oats, grass.

Principal live-stock, cattle, hogs, horses.

Topography, undulating.

SHIPMENTS.

Cattle, hd	4,688	Apples, brls	35
Hogs, hd	8,857	Poultry, lbs	10,652
Horses and mules, hd	200	Eggs, doz	3,215
Sheep, hd	100	Butter, lbs	2,749
Mixed live-stock, cars	3	Timothy seed, bus	148
Corn, bus	750	Clover seed, bus	13
Oats, bus	3,238	Hungarian seed, bus	21
Wool, lbs	12,000	Millet, bus	702
Hides, lbs	2,460	Hoops, cars	15
Flour, lbs	46,230	Junk, cars	2
Shipstuff, lbs	23,410	Other cars	6

WRIGHT.

Land, per cent in cultivation and pasture	25
of remainder that could be profitably enclosed	60
enclosed and cultivated has increased in last 10 years	70
in commercial timber	36

Principal agricultural productions, corn, wheat, timothy and clover, and fruit, to which a large acreage is now being planted.

Principal live-stock, hogs, cattle, sheep.

Minerals, lead and zinc.

Minerals developed, lead and zinc in limited quantities.

Topography, south part broken, north undulating.

SHIPMENTS.

Cattle, hd	3,216	Farm produce, lbs	198,000
Hogs, hd	16,915	Lumber, cars	14
Horses and mules, hd	704	Ties and posts, cars	1,126
Sheep, hd	2,200	Wood, cars	139
Cotton-seed, bus	375	Coal, cars	4
Wheat, bus	15,333	Ice, cars	18
Corn, bus	1,396	Other cars	29
Flour, lbs	4,710,000	Miscellaneous, lbs	2,116,000

INDEX.

	Page
Agriculture, State Board of	4
Cheap Lands in Missouri	75
Crop reports	88
County Fair Associations—	
Atchison	109
Central Atchison	110
Buchanan (St. Joseph)	111
Bates (Rich Hill)	112
Caldwell (Hamilton)	113
Carroll	114
Cass (Belton)	115
Cape Girardeau	116
Chariton	117
Clark	118
Clay	119
Gasconade	120
Grundy	121
Harrison (Ridgeway)	122
Johnson	123
Lincoln	124
Livingston	125
Nodaway	126
Pike (Louisiana)	127
Platte	128
Ray (Lawson)	129
Schuyler	130
Sullivan	133
Finalcial statement	13
Farmers' Institute fund	11
crop reports	15
office expense fund	16
expenses of members	17
distribution of annual report	18
weather service	19
receipts and expenditures	22
secretary's salary	23
Letter of Transmittal	0
Meeting of State Board for organization	23
election of officers	28
Missouri at the World's Fair	41
synopsis of doings of Missouri World's Fair Commission	43
department of agriculture	44
live-stock	46
department of horticulture	48
mines and mining	46
forestry	51
educational	52
wool, dairy, fish and bird exhibits	53
ways and means	55
Premium awards	55
saddle horses	55
jacks and jennets	56
mules	56
awards to Wallace Estill, of Howard county	56
Short-horns	57
Herefords	57
Red Polled	58
Jerseys	58
Swine—	
Berkshire	61
Poland-China	61
Sheep—	
Southdown	63
Merino	63
Delaine Merino	64
wools	64
poultry	64
agriculture	65
fruit	55
forestry	65
Missouri Mineral Exhibits at the Exposition, by E. O. Hovey	66
Illustrations—	
Hon. J. K. Gwynn	39
Aberdeen-Angus cattle	44
cow "Abbess of Turlington"	48
short-horn heifer "Dora"	52
jack "Monarch"	55
Red Polled bull	59
Berkshire boar "King Lee"	62
stallion "Lee Rose"	66
stallion "Artist Montrose"	70
stallion "Forrest Squirrel"	74
Barred Plymouth Rocks	78
Miscellaneous Papers—	
The Farmer's Horse	132
Improved Stock	136
Hogs	143
Bee-keeping for Farmers	144
Country Roads	149
Good Roads—Why, Where, When and How Get Them	153
Good Roads	156
Agricultural Education	158
Country vs. City	161
Work of the Weather Bureau and its Relation to the Farmer	164
Work of the State Board of Agriculture	168

Miscellaneous Papers—	Page
Business Farming	170
Agriculture and Its Needs	174
Horticulture in Missouri	176
Anthrax	179
Broom-corn	182
Our Horse Market	183
Good Roads	187
Tillage	199
Sugar from the Stalks of Indian Corn	207
Missouri Weather Service, Report of	245
Stations and equipment	245
Monthly Meteorological Bulletin	247
Weekly Weather-crop Bulletins	247
daily maps, forecasts, cold-wave and frost warnings	248
final remarks	249
monthly and annual mean temperature	251
monthly and annual precipitation	253
Secretary, Report of	5
Farmers' Institutes	7
State Weather Service	10
Monthly Bulletin	10
Weather-crop Bulletin	11
voluntary and regular U. S. weather observers' stations	11
State Veterinarian, Report of	211
quarterly reports	215
inspectors' visits, expenses and mileage	226
diseases	229
parasites affecting domestic animals	230
Shipments of products (by counties)	259
Adair	263
Andrew	264
Atchison	265
Audrain	266
Barry	267
Barton	268
Bates	269
Benton	270
Bollinger	271
Boone	272
Buchanan	273
Butler	274
Caldwell	275
Callaway	276
Cape Girardeau	277
Camden	278
Carroll	279
Carter	280
Cass	281
Chariton	282
Christian	283
Clark	284
Clay	285
Clinton	286
Cole	287
Cooper	288
Crawford	289
Dade	290
Daviess	291
DeKalb	292
Dent	293
Dunklin	294
Franklin	295
Gasconade	296
Gentry	297
Greene	298

	Page
Grundy	299
Harrison	300
Henry	301
Holt	302
Howard	303
Howell	304
Iron	305
Jackson	306
Jasper	307
Jefferson	308
Johnson	309
Knox	310
Laclede	311
Lafayette	312
Lawrence	313
Lewis	314
Lincoln	315
Linn	316
Livingston	317
McDonald	318
Macon	319
Madison	320
Marion	321
Mercer	322
Miller	323
Mississippi	324
Moniteau	325
Monroe	326
Montgomery	327
Morgan	328
New Madrid	329
Newton	330
Nodaway	331
Oregon	332
Osage	333
Perry	334
Pettis	335
Phelps	336
Pike	337
Platte	338
Polk	339
Pulaski	340
Putnam	341
Ralls	342
Randolph	343
Ray	344
Ripley	344
St. Charles	378
St. Clair	346
St. Francois	346
St. Louis	345
Saline	350
Schuyler	351
Scotland	352
Scott	353
Shannon	354
Shelby	355
Stoddard	356
Sullivan	357
Texas	358
Vernon	359
Warren	360
Washington	361
Wayne	362
Webster	365
Worth	364
Wright	363